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OUR SOUTH AFRICAN FLORA

ONS SUID-AFRIKAANSE PLANTEGROEI

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PROTEA CYNAROIDES

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OUR SOUTH AFRICAN FLORA

Edited by

R. H. COMPTON, M.A. (Cantab.), F.R.S.S.Af., Hon. F.R.H.S.

Director of the National Botanic Gardens, Kirstenbosch, Cape Town.

ONS SUID-AFRIKAANSE PLANTEGROEI

Geredigeer deur

R. H. COMPTON, M.A. (Cantab.), F.R.S.S.Af., Hon. F.R.H.S.

Direkteur van die Nasionale Botaniese Tuin, Kirstenbosch, Kaapstad.

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FOREWORD

THE Flora of South Africa is celebrated for its great size as reckoned in number of species; for its endless botanical interest; and also for its richness in plants of beauty and distinction.

The illustrations in this book have been made from a few of the vast number of subjects which the South African flora presents. They depict plants from various parts of the Union, though the Cape Province with its outstanding floral wealth is most in evidence. They have also been chosen in order to give examples of plants of various natural affinities, though here again certain families have more than their share and others less. Many of our floral favourites which have been figured on innumerable occasions are here omitted, their places being taken by less familiar subjects. Photography has been used throughout, direct colour work in some cases, hand-coloured prints in others. Nearly all the pictures have been made from specimens grown in the National Botanic Gardens, Kirstenbosch.

In the first part of the book is discussed the origin of the South African Flora, its resemblances to the floras of other countries and its differences from them, this involving the absorbing problems of geographical distribution, migration and evolution.

Next follows a brief summary of the most important families of which our flora is composed, with a few remarks on each and references to the illus-

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VOORWOORD

DIE plantegroei van Suid-Afrika is beroemd weens sy groot verskeidenheid, weens sy oneindigende botaniese belangrikheid en weens sy ryke skat van pragtige en unieke soorte.

Die afbeeldings in hierdie bundel is dié van 'n paar van die eindelose verskeidenheid wat deur die Suid-Afrikaanse plantewêreld aangebied word. Hulle stel plante uit verskillende dele van die Unie voor, alhoewel die uit die Kaapprovinsie met sy buitengewone blommerykdom die meerderheid uitmaak. Hulle is ook gekies om voorbeelde van plante met verskeie kenmerke van natuurlike verwantskap aan te toon, alhoewel daar ook hier sekere soorte is wat meer, en ander wat minder as hul regmatige aandag verkry. 'n Groot aantal van ons geliefkoosde blomme wat al baie dikwels bespreek is, is hier weggelaat en hul plekke word deur minder bekende soorte ingeneem. Dwarsdeur is van fotografie gebruik gemaak, in sommige gevalle regstreekse kleurfotografie en in ander gevalle prente met die hand gekleur. Byna al die afbeeldings is van plante wat in die Nasionale Botaniese Tuin, Kirstenbosch, gekweek word.

In die eerste deel van die bundel word die oorsprong van die Suid-Afrikaanse plantegroei, die ooreenstemmings en afwykings daarvan in vergelyking met die plantegroei van ander lande, behandel, waarby die boeiende vraagstukke insake geografiese distribusie, verspreiding en evolusie, ook behandel word.

Daarna volg 'n kort opsomming van die belangrikste families waaruit ons plantegroei bestaan, met 'n paar aantekeninge oor elkeen en verwysings na

trations. This and in fact the whole book is necessarily inadequate to the subject.

An attempt is then made to deal with the principal different types of vegetation found in the Union: so that instead of simply considering individual species detached from their surroundings we regard the plants in relation to their conditions of life, climate and soil and to one another, and as producing plant-societies such as forest, grass-veld, etc.

Finally some biological subjects are outlined, especially nutrition (parasitism, carnivory), drought resistance (succulence) and reproduction (pollination, dispersal).

It is hoped that this book, short as it is, may remind South African readers of the marvellous beauty and variety of their country's flora, and may strengthen in them the desire to respect and preserve it as one of their most valuable possessions: and that it may also give them some idea of the botanical interest which can be obtained from a study of the flora from other points of view than that of the mere naming of specimens.

R. H. Compton

die afbeeldings. Laasgenoemde, en trouens die hele boek, is noodwendig 'n onvolledige verhandeling oor die onderwerp.

'n Poging is vervolgens aangewend om die vernaamste soorte plantegroei wat in die Unie aangetref word, te bespreek: sodat, in plaas van om eenvoudig die individuele soorte verwyder van hul omgewing te behandel, ons die plante beskou in hul verhouding tot hul lewensomstandighede, die klimaat en grond en tot mekaar, asook uit die oogpunt van die daarstelling van plantgenootskappe soos bosse, grasveld, ens.

Ten besluite word enige plantkundige onderwerpe uiteengesit, veral voeding (parasitisme, karnivoriteit), bestandheid teen droogte (sappigheid) en voortplanting (bestuiwing, verspreiding).

Die hoop word uitgespreek dat hierdie bundel, kort soos dit is, Suid-Afrikaanse lesers aan die grootse prag en verskeidenheid van ons land se plantegroei sal herinner en by hulle die begeerte sal versterk om dit te bewonder en dit as een van hul waardevolste besittings te bewaar: en dat dit ook aan hulle 'n idee kan gee van die belangstelling wat opgewek kan word deur 'n studie van die plantegroei uit ander gesigspunte as dié van blote toekenning van name aan plantesoorte.

CONTENTS

FOREWORD		Page iv
CHAPTER ONE	WHERE DID THE SOUTH AFRICAN FLORA COME FROM?	Page 1
CHAPTER TWO	CLASSIFICATION OF THE SOUTH AFRICAN FLORA	Page 17
CHAPTER THREE	TYPES OF SOUTH AFRICAN VEGETATION	Page 47
	FORESTS: THE SOCIETY OF TREES AND THEIR UNDERGROWTH	Page 51
	SCRUB: THE SOCIETY OF BUSHES AND THEIR COMPANIONS	Page 57
	KAROO, SEMI-DESERT AND DESERT: THE SOCIETIES OF THIRSTLAND	Page 63
	GRASSLAND: THE ILLIMITABLE VELD	Page 69
	SAVANNAH AND BUSHVELD: THE PARKLIKE WILDERNESS	Page 75
	OTHER TYPES OF VEGETATION	Page 81
CHAPTER FOUR	HOW SOME OF OUR PLANTS LIVE	Page 89

FULL PAGE ILLUSTRATIONS

Giant Protea	*Protea cynaroides*	Reuse Suikerbos
Belladonna Lelie	*Amaryllis belladonna*	Belladonna Lily
Haemanthus katherinae	*Haemanthus katherinae*	Haemanthus katherinae
Nerina	*Nerine sarniensis*	Nerina

INHOUD

INLEIDING		*Bladsy* v
HOOFSTUK EEN	WAARVANDAAN HET DIE SUID-AFRIKAANSE PLANTEGROEI GEKOM?	*Bladsy* 2
HOOFSTUK TWEE	KLASSIFIKASIE VAN DIE SUID-AFRIKAANSE PLANTEGROEI	*Bladsy* 18
HOOFSTUK DRIE	TIPES VAN SUID-AFRIKAANSE PLANTEGROEI	*Bladsy* 48
	BOSSE: DIE GENOOTSKAP VAN BOME EN HUL STRUIKGEWASSE	*Bladsy* 52
	STRUIKGEWASSE: DIE GENOOTSKAP VAN BOSSIES EN HUL MATERS	*Bladsy* 58
	KAROO, HALF-WOESTYN EN WOESTYN: DIE GENOOTSKAPPE VAN DIE DORSLAND	*Bladsy* 64
	GRASVELD: DIE EINDELOSE VLAKTE	*Bladsy* 70
	SAVANNA EN BOSVELD: DIE PARKAGTIGE WILDERNIS	*Bladsy* 76
	ANDER TIPES VAN PLANTEGROEI	*Bladsy* 82
HOOFSTUK VIER	HOE SOMMIGE VAN ONS PLANTESOORTE LEEF	*Bladsy* 90

VOL BLAD-PLATE

KALKOENTJIE	*Gladiolus alatus*	KALKOENTJIE
RED DISA	*Disa uniflora*	ROOI DISA
SOUR FIGS	*Mesembryanthemum spp.*	VYGIES
BRUNIA STOKOEI	*Brunia stokoei*	BRUNIA STOKOEI

ILLUSTRATIONS

PLATELYS

NO.				PAGE
1	Kafir Bread Tree	*Encephalartos Altensteinii*	Broodboom	1
2	Willowmore Cypress	*Widdringtonia Schwartzii*	Willowmore-Sapree	2
3	Red Top Grass	*Rhynchelytrum repens*	Rhynchelytrum repens	3
4	Yellow Arum Lily	*Richardia Elliottana*	Geel Varklelie	4
5	Agapanthus	*Agapanthus umbellatus*	Agapanthus umbellatus	5
6	Bitter Aloe	*Aloe ferox*	Alwyn	6
7	Gloriosa superba	*Gloriosa superba*	Gloriosa superba	7
8	Red Hot Poker	*Kniphofia alooides*	Vuurpyl	8
9	Lachenalia tricolor	*Lachenalia tricolor*	Klipbelletjie	9
10	Chincherinchees	*Ornithogalum spp.*	Ornithogalum spp.	10
11	Wachendorffia thyrsiflora	*Wachendorffia thyrsiflora*	Wachendorffia thyrsiflora	11
12	Water Crinum	*Crinum campanulatum*	Crinum campanulatum	12
13	Sore Eye Flower	*Cyrtanthus obliquus*	Justifina	13
14	Nerina	*Nerine appendiculata*	Nerine appendiculata	14
15	Babiana spp.	*Babiana spp.*	Bobbejaantjies	15
16	Riversdale Bluebell	*Gladiolus Bolusii var. Burchellii*	Riversdal-Bakpypie	16
17	Ixias	*Ixia spp.*	Kalossies	17
18	Peacock Flower	*Morea villosa*	Uiltjies	18
19	Tritonias	*Tritonia spp.*	Rooikalossies	19
20	Crane Flower	*Strelitzia Reginae*	Geel Piesang	20
21	Drip Disa	*Disa longicornu*	Drupdisa	21
22	Swamp Disa	*Disa racemosa*	Vleidisa	22
23	Polystachya pubescens	*Polystachya pubescens*	Polystachya pubescens	23
24	Silver Tree	*Leucadendron argenteum*	Witteboom	24
25	Leucadendron discolor	*Leucadendron discolor*	Leucadendron discolor	25
26	Pincushions	*Leucospermum nutans*	Luisies	26
27	Leucospermum reflexum	*Leucospermum reflexum*	Leucospermum reflexum	27
28	Mimetes lyrigera	*Mimetes lyrigera*	Stompie	28
29	Marsh Rose	*Orothamnus Zeyheri*	Orothamnus Zeyheri	29
30	Big Woolly Protea	*Protea barbigera*	Groot Wollerige Suikerbos	30
31	Bot River Protea	*Protea compacta*	Botrivier-Suikerbos	31
32	Protea grandiceps	*Protea grandiceps*	Protea grandiceps	32
33	Blushing Bride	*Serruria florida*	Trots van Franschhoek	33
34	Sour Figs	*Mesembryanthemum spp.*	Vygies	34
35	Stone Plant	*Lithops Lesliei*	Toontjie	35
36	Water Lily	*Nymphaea stellata*	Waterlelie	36
37	Cape Anemone	*Anemone capensis*	Anemoon	37
38	Wild Stock	*Brachycarpaea varians*	Blou Riet	38
39	Cotyledon orbiculata	*Cotyledon orbiculata*	Hondeoor	39
40	Red Crassula	*Rochea coccinea*	Keiserskroon	40
41	Berzelia abrotanifolia	*Berzelia abrotanifolia*	Kolkol	41
42	Pride of de Kaap	*Bauhinia Galpinii*	Bauhinia Galpinii	42
43	Bush Tea	*Cyclopia genistoides*	Heuningtee	43
44	Erythrina Humeana	*Erythrina Humeana*	Erythrina Humeana	44
45	Mountain Dahlia	*Liparia spherica*	Geelkop	45
46	Silver Pea	*Priestleya villosa*	Priestleya villosa	46

NO.				PAGE
47	Psoralea aphylla	*Psoralea aphylla*	Bloukeur	47
48	Cancer Bush	*Sutherlandia frutescens*	Gansies	48
49	Scarlet Geranium	*Pelargonium inquinans*	Rooi Malva	49
50	Yellow Sorrel	*Oxalis pes caprae*	Geel Suring	50
51	Purple Sorrel	*Oxalis purpurea*	Rooi Suring	51
52	Adenandra Fragrans	*Adenandra fragrans*	Klipsissie	52
53	Chinese Lanterns	*Nymania capensis*	Klapperbos	53
54	Polygala virgata	*Polygala virgata*	Bloukappie	54
55	Wild Bottlebrush	*Greyia Sutherlandii*	Baakhout	55
56	Hibiscus diversifolius	*Hibiscus diversifolius*	Hibiscus diversifolius	56
57	Natal Redwood	*Ochna natalitia*	Rooihout	57
58	Wild Begonia	*Begonia Sutherlandii*	Begonia Sutherlandii	58
59	Dais cotinifolia	*Dais cotinifolia*	Kannabast	59
60	Mealie Heath	*Erica abietina*	Mielie-Heide	60
61	Erica axilliflora	*Erica axilliflora*	Erica axilliflora	61
62	Lantern Heath	*Erica blenna*	Riversdal-Heide	62
63	Erica foliacea	*Erica foliacea*	Erica foliacea	63
64	Prince of Wales Heath	*Erica perspicua*	Veerheide	64
65	Elim Heath	*Erica regia*	Belletjieheide	65
66	Erica subdivaricata	*Erica subdivaricata*	Erica subdivaricata	66
67	Erica viridipurpurea	*Erica viridipurpurea*	Bosluisblom	67
68	Plumbago	*Plumbago capensis*	Plumbago capensis	68
69	Pink Statice	*Statice rosea*	Strandroos	69
70	Wild Jasmine	*Jasminum tortuosum*	Wilde Jasmyn	70
71	Sebaea exacoides	*Sebaea exacoides*	Sebaea exacoides	71
72	Strophanthus speciosus	*Strophanthus speciosus*	Strophanthus speciosus	72
73	Ceropegia ampliata	*Ceropegia ampliata*	Ceropegia ampliata	73
74	Carrion Flower	*Stapelia Schinzii*	Aasblom	74
75	Cape Forget-me-not	*Anchusa riparia*	Ystergras	75
76	Minaret Flower	*Leonotis Leonurus*	Wilde Dagga	76
77	Plectranthus saccatus	*Plectranthus saccatus*	Plectranthus saccatus	77
78	Diascia capsularis	*Diascia capsularis*	Diascia capsularis	78
79	Harveya Bolusii	*Harveya Bolusii*	Harveya Bolusii	79
80	Nemesia	*Nemesia strumosa*	Leeubekkies	80
81	Sutera grandiflora	*Sutera grandiflora*	Sutera grandiflora	81
82	Port St. Johns Creeper	*Podranea Ricasoliana*	Port St. Johns-Klimop	82
83	Wild Pomegranate	*Rhigozum obovatum*	Driedoring	83
84	Kafir Honeysuckle	*Tecomaria capensis*	Kaffer-Kamperfoelie	84
85	Sesame	*Sesamum capense*	Sesam	85
86	Streptocarpus multiflorus	*Streptocarpus multiflorus*	Streptocarpus multiflorus	86
87	Mackaya	*Mackaya bella*	Mackaya bella	87
88	Alberta magna	*Alberta magna*	Alberta magna	88
89	Wild Pomegranate	*Burchellia capensis*	Buffelshoring	89
90	Gardenia	*Gardenia Thunbergii*	Katjiepiering	90
91	Scabious	*Scabiosa columbaria*	Scabiosa columbaria	91
92	Blue Lobelia	*Lobelia pinifolia*	Blou Lobelia	92
93	Roella ciliata	*Roella ciliata*	Roella ciliata	93
94	Marigold	*Arctotis spp.*	Gousblom	94
95	Wild Aster	*Aster fruticulosus*	Wilde Aster	95
96	Blue Daisy	*Charieis heterophylla*	Blou Madeliefie	96
97	Athanasia trifurcata	*Athanasia trifurcata*	Klaas Louwbos	97
98	Barberton Daisy	*Gerbera Jamesonii*	Gerbera Jamesonii	98
99	Everlasting	*Phoenocoma prolifera*	Sewejaartjie	99
100	Ursinia anethoides	*Ursinia anethoides*	Ursinia anethoides	100

Where did the South African Flora come from?

In South Africa we live in the midst of vegetation distinct in many ways from that which grows in any other country.

We ourselves—those of us who are Europeans—are more or less recent immigrants from other countries, and we have brought with us or imported a large number of plants which serve us for useful purposes—timber trees from Europe, America and Australia, decorative garden plants, fruits, vegetables, cereals from all over the world. These plants, like ourselves, are newcomers to an ancient land, and their introduction is a matter of modern history. But what, we ask, is the history of the plants which were here before us—plants which astonished and delighted the eyes of the earliest Europeans to visit this country, and for the most part unlike anything they had seen before, though a few seemed slightly familiar? Whence came these indigenous plants, so characteristic of South Africa and yet, as closer study revealed, showing definite similarities to plants of certain other countries? Let us examine this question and consider what is the nature of the resemblances between the

No. 1
KAFIR BREAD TREE.
BROODBOOM.
ENCEPHALARTOS ALTENSTEINII.

Waarvandaan het die Suid-Afrikaanse plantegroei gekom?

In Suid-Afrika lewe ons te midde van plantegroei wat in baie opsigte verskil van dié wat in enige ander land aangetref word.

Ons self—diegene van ons wat blankes is—is immigrante wat maar kort gelede uit ander lande verhuis het, en ons het 'n groot aantal plante met ons saamgebring of ingevoer wat vir nuttige doeleindes gebruik word—timmerhoutbome uit Europa, Amerika en Australië, sierplante, vrugte, groente, graansoorte van oor die hele wêreld. Net soos ons, is hierdie plante nuwe aankomelinge in 'n ou wêreld-deel en hul aankoms behoort tot die moderne geskiedenis. Maar wat is die geskiedenis van die plante wat hier was voor ons, vra ons—plante waardeur die oë van die vroegste blankes wat ons land besoek het, betower is, deurdat hulle verskil het van enigiets wat hulle tot dusver gesien het, hoewel 'n paar soorte 'n bietjie bekend gelyk het. Waarvandaan het hierdie inheemse plante gekom, wat so kenmerkend van Suid-Afrika is, en wat na nouer ondersoek geblyk het om definitief in sekere opsigte met die plante uit ander lande ooreen te stem? Laat ons op hierdie vraag ingaan en die aard van

No. 2
WILLOWMORE-SAPREE.
WILLOWMORE CYPRESS.
WIDDRINGTONIA SCHWARTZII.

No. 3
RED TOP GRASS.
RHYNCHELYTRUM REPENS.

South African flora and those of other countries, and in what ways it is distinct; and let us try to find the explanation.

Take the great Protea family, so characteristic a feature of the coastal belt of the Cape Province. Travel eastwards across the Indian Ocean and we find obvious relatives of the Proteas in Australia; travel westwards across the Atlantic and we find others in South America. Or take the Ericas or Heaths: there are hundreds of species of them in the Cape Province, and, thousands of miles away, there are a few species in the Mediterranean region and some that colour the moors purple in northern Europe, the connecting link being a thin sprinkling of them along the high mountains of Central Africa. (Incidentally, we may note that there are no representatives of the Erica family in Australia nor of the Protea family in Europe.) If we go to India or Ceylon we see tree Euphorbias very similar to those of the Eastern Cape or the Transvaal. Our Stinkwood Tree has large numbers of close relations in South America. The thorn-bushes which cover thousands of square miles of the Union are obviously related, as we can see from their flowers, to those recent arrivals from Australia, the wattles.

Everywhere one sees similarities between the South African flora and the floras of other countries, east, west, north and even south (for the Antarctic Continent had its own flora, as the fossils show, when its climate was mild.)

To the botanist the resemblances between the South African plants and those of other countries are explainable as the results of migration—the travelling of plants over the surface of the globe.

To some people this may be difficult to understand. They think that one of the chief differences between an animal and a plant is that an animal can move, whereas a plant is stationary, rooted to the ground. Yet, on the whole, plants are more mobile than animals owing to the various means they have of distributing their seeds far and wide by wind, rivers, ocean currents, and so on; and also by the fact that chance migrations of animals are checked by the need for two

die ooreenstemming asook die verskille tussen die Suid-Afrikaanse plantegroei en dié van ander lande opweeg ; en laat ons dan 'n uitleg probeer gee.

Neem die groot protea-familie wat so 'n uitstaande kenmerk van die kusstreke van die Kaapprovinsie is. Reis in 'n oostelike rigting oor die Indiese Oseaan, en u sal klaarblyklike verwantes van die protea in Australië aantref; reis weswaarts oor die Atlantiese Oseaan, en u sal verwante plante in Suid-Amerika aantref. Of neem die erica of heide ; daar is honderde vertakkinge daarvan in die Kaapprovinsie, en duisende myle ver is daar 'n paar soorte in die Mediterrane gebied en 'n reeks wat die veenstreke pers kleur in Noord-Europa—die verbindende skakel waarvan 'n ylerige verspreiding is wat op die hoë berge van Midde-Afrika groei. (Terloops kan ons daarop wys dat daar geen verteenwoordigers van die ericoïede-familie in Australië of van die protea-familie in Europa is nie.) As ons na Indië of Ceylon gaan, sal ons daar bome behorende tot die euphorbia-soort aantref, wat 'n baie nou verwantskap toon met dié van die Oostelike Kaap of die Transvaal. Ons stinkhoutboom het 'n groot aantal nou verwante soorte in Suid-Amerika. Die doringbome wat duisende vierkante myle van die Unie bedek, is volgens hul blomme te oordeel klaarblyklik aan daardie onlangse aankomelinge van Australië, die wattelboom, verwant.

Orals bemerk 'n mens verwante eienskappe tussen die Suid-Afrikaanse plantelewe en dié van ander lande in die ooste die weste, die noorde en selfs die suide (aangesien die Suidpoolstreek sy eie plantegroei gehad het, volgens fossiele daar ontdek, toe die klimaat daarvan gematigd was).

Die plantkundiges verklaar die verwante eienskappe van die Suid-Afrikaanse plante en dié van ander lande as synde die gevolg van verhuising—die verspreiding van plante oor die oppervlakte van die aardbol.

Vir sommige mense is hierdie opvatting moeilik om te begryp. Hulle meen dat een van die vernaamste verskille tussen 'n dier en 'n plant beweeglikheid is, d.w.s. dat 'n dier hom kan beweeg oor die aarde, terwyl 'n plant in die grond vasgeanker is.

No. 4
GEEL VARKLELIE.
YELLOW ARUM LILY.
RICHARDIA ELLIOTTANA.

individuals, male and female, to propagate the race, whereas plants which are so often bisexual, are frequently independent of limitations of this kind.

If, therefore, we find the same or related plants in separate localities, close or distant, we usually conclude that migration must have taken place from one locality to the other or *vice versa*, or from some common origin to both.

No. 5
AGAPANTHUS.
AGAPANTHUS UMBELLATUS.

Now, migration is a very slow process as a rule, in a state of Nature. It is true that many instances are known of the very rapid spread of a plant after it has entered a new country. Some of our noxious weeds come to mind in which a species has been spread over hundreds of miles of country in a few years or in a generation or two. But such plants as these are almost always assisted in spreading by human agency—by agriculture, veld burning, grazing, transport of forage and stock, etc.

Plants which are not capable of being helped in such ways as these usually travel very slowly. For instance, Silver Trees grow in the Cape Peninsula and 25 miles away, near Somerset West. Let us suppose that the intervening Cape Flats provided suitable ground for the growth of Silver Trees—which is not the case to-day whatever it may have been in past ages. Let us also observe that a Silver Tree starts to produce seeds at about ten years old and that the seeds can seldom be scattered more than ten yards from the parent tree. Then a little arithmetic will show that the migration of Silver Trees from the Peninsula to Somerset West (if that is the way it happened) must have taken something like 45,000 years to accomplish, and probably a good deal more. The same arguments apply more or less to all the plants composing the flora.

Many species have a vastly greater range than the Silver Tree. Others have an even smaller range. Our well-known Red Erica, for instance, extends from Cape Point right through Africa to the mountains of Abyssinia, say 4,000 miles. Another Erica, Fair's Heath, is confined to an acre or two in the Glencairn Mountains. Generally speaking, the longer a plant has had to migrate the further it will have reached ; and, conversely, we come to the conclusion that

Tog is plante meer beweeglik as diere, omdat daar verskillende maniere is waarop hulle hul saad kan versprei, soos by voorbeeld deur die wind, riviere, seestromings, ens. Boonop is die moontlikheid van die verspreiding van diere van twee van hul soort, naamlik mannetjie en wyfie, afhanklik om voortplanting te verseker, terwyl plante wat so dikwels tweeslagtig is, vrygestel is van sulke beperkings.

In die natuur vind verspreiding gewoonlik baie stadig plaas. Dit is waar dat daar baie voorbeelde bestaan van waar 'n plant baie vinnig versprei het nadat dit in 'n nuwe land posgevat het. In hierdie verband dink ons aan sommige soorte onkruid wat binne 'n paar jaar of binne 'n geslag of twee oor honderde myle versprei geraak het. Die verspreiding van hierdie soort plante is egter byna altyd toe te skryf aan menslike tussenkoms in verband met landbou, soos veldbrande, weiding, die vervoer van voer en vee, ens.

Plante waarvan die verspreiding nie op sulke maniere gehelp word nie, versprei gewoonlik baie stadig. Silwerbome groei by voorbeeld in die Kaapse Skiereiland en ook naby Somerset-Wes, 25 myl ver. Laat ons veronderstel dat die grond van die tusseninliggende Kaapse Vlakte geskik was vir silwerbome—wat nie vandag die geval is nie, hoewel dit die geval in die verlede kon gewees het: laat ons ook daarop let dat 'n silwerboom op die ouderdom van ongeveer tien jaar begin saad skiet en dat die saad selde of ooit meer as tien tree van die ouerboom versprei word. Deur van 'n bietjie rekenkunde gebruik te maak, sal ons sien dat die verspreiding van silwerbome van die Skiereiland na Somerset-Wes (as dit die manier is waarop dit plaasgevind het) sowat 45,000 jaar en waarskynlik heelwat langer in beslag moes geneem het. Dieselfde argument geld min of meer vir alle plante wat blomme dra.

No. 6
ALWYN.
BITTER ALOE.
ALOE FEROX.

Baie soorte versprei oor baie groter afstande as die silwerboom; ander soorte versprei nie eens so ver nie. Ons bekende Rooi Erica word by voorbeeld van Kaappunt dwarsdeur Afrika tot aan die berge van Abessinië, 'n afstand van sowat 4,000 myl, aangetref. Nog 'n Ericoïede, Fair's Heath, is tot 'n akker of twee in die Glencairn-berg beperk.

No. 7
GLORIOSA SUPERBA.

the Red Erica is á very old species, whereas Fair's Heath is probably a relatively young one, which has not yet had time to spread very far.

When we consider such plants as the Protea family, present in all three continents of the Southern Hemisphere, it is clear that we must allow millions of years for them to accomplish their migrations, changing gradually as they travelled and producing all the great number of different forms which we call the Protea family to-day.

We have to remember, too, that from the point of view of the history of the plant kingdom the flowering plants of to-day are relatively modern. It is true that they seem to go back for some thirty million years at least, but this is only a fraction of the total history of the plant world on this planet. Before the flowering plants originated and spread over the earth's surface other forms of plant life covered the ground. There was the age of the fern-like seed-plants, the age of the giant horsetails and clubmosses, the age of the primitive ferns, the age of simple algae living in the ocean before the emergence of life, animal and plant, from the sea on to the dry land took place.

Some relics of these incredibly remote times persist with us to-day. Our well-known Cycads or Kafir Bread Trees (Fig. 1) are of enormous antiquity. They occur in the Eastern Province and Cape Midlands and extend through Natal, Zululand and the Transvaal to the Congo and the Gold Coast on the west and to Zanzibar and the Sudan on the east. Closely similar, though distinct, Cycads exist in other temperate and tropical parts of the world.

Nothing could be more slow and deliberate than the Cycads—slow in growth, slow in coming to maturity, slow in distribution. How have they spread from continent to continent, separated by vast spaces of ocean? The answer may lie in the wonderful theory propounded by Wegener—the theory of floating continents. Far back in the world's history, though after the Cycads had appeared, the southern continents were clustered together in one vast unbroken land mass. Then the Cycads and other prehistoric flora and fauna

BELLADONNA LELIE BELLADONNA LILY

AMARYLLIS BELLADONNA

BELLADONNA LELIE BELLADONNA LILY

AMARYLLIS BELLADONNA

Amaryllis Belladonna, the Belladonna Lily, is a flower universally known and loved. The leaves are produced in the winter, but die off at the beginning of summer : the flowers rise from the bulb about March. Their colour is pink of various shades, and they have a strong and characteristic odour. It is locally abundant in the scrub of the South-Western Cape, and has been much planted in gardens.

Amaryllis Belladonna, die Belladonnalelie, is 'n blom wat algemeen bekend is en byval vind. Die blare bot in die winter maar sterf aan die begin van die somer : die blomme spruit om en by Maart-maand uit die bol. Hul kleur is 'n afwisselende soort ligroos en hulle besit 'n sterk en kenmerkende geur. Dit word plaaslik in oorvloed tussen die struikgewasse van Suidwes-Kaapland aangetref en is op 'n groot skaal in tuine gekweek.

As ons sulke plante soos die Protea-familie in ag neem, wat aanwesig is in aldrie wêreld-dele van die suidelike halfrond, is dit duidelik dat ons miljoene jare vir hulle moet toelaat waarin hulle hulself kon versprei het, gedurende welke tyd hulle geleidelik 'n gedaanteverwisseling ondergaan en die groot aantal verskeidenhede wat ons vandag as die Protea-familie bestempel, as gevolg gehad het.

Ons moet ook onthou dat uit die oogpunt van die geskiedenis van die planteryk die hedendaagse blomplante betreklik jonk is. Dit is waar dat dit skyn asof hulle minstens dertigmiljoen jaar gelede begin het, dog dit is slegs 'n grepie uit die totale geskiedenis van die plantlewe op hierdie planeet.

No. 8
VUURPYL.
RED HOT POKER.
KNIPHOFIA ALOOIDES.

Voordat die blomplante begin bestaan en oor die oppervlakte van die aarde versprei het, het ander vorms van plantlewe die aarde bedek. Daar was die tydperk van die varingagtige saadplante; die tydperk van die reuse perdesterte en knuppelmossoorte; die tydperk van die primitiewe varings; die tydperk van eenvoudige seewiere wat in die oseaan aanwesig was voordat diere- en plantlewe van uit die see na droë grond oorgeplant is.

'n Aantal oorblyfsels uit hierdie ongelooflik verafgeleë oertyd is vandag te bespeur, soos by voorbeeld ons welbekende Cycadeë of Kafferbroodbome (Afb. 1). Hulle word in die Oostelike Provinsie en die Kaapse Middellande aangetref en is versprei oor Natal, Zoeloeland en die Transvaal tot by die Kongo en die Goudkus in die weste en tot by Zanzibar en die Soedan in die ooste. Cycadeë wat na aan hulle verwant is dog afsonderlik is, bestaan in ander gematigde en tropiese dele van die wêreld.

Daar is seker geen vorm van plantlewe wat so stadig en tydsaam is as die Cycadeë nie—stadig wat betref groeikrag, stadig wat betref rypwording, stadig wat betref distribusie. Hoe het hulle van die een vasteland na die ander, oor duisende myle van oseaan heen, versprei? Die antwoord lê miskien opgesluit in die wonderlike teorie deur Wegener opgestel—die teorie van die drywende vastelande. Ver terug in die wêreld se geskiedenis, hoewel

could wander freely from one continent to another without awkward jumps across oceans. Later on the continents split apart from one another and drifted off in their various directions, floating on the plastic interior of the globe: and with them they carried, like passengers on liners, their living cargo of plants and animals.

No. 9
KLIPBELLETJIE.
LACHENALIA TRICOLOR.

This theory of floating continents does not help us with the problems of distribution of the flowering plants, for they did not appear upon the earth until after the southern continents had started to drift apart from one another. How then can we explain the presence of similar plants in widely separated localities?

Take the Ericas as an example. It seems probable that they originated somewhere in Africa—perhaps in the mountains of Central Africa—and spread both northward into Europe and southward into the Cape Province, evolving new species as they travelled. We can picture that the ones which reached Europe were the tougher species, more hardy in severe climates and quite limited in numbers. The ones that came south were, so to speak, tourists attracted by the well-known South African climate, which, together with our soils, they found very much to their liking: they proceeded to settle here and to evolve in the Cape coastal belt the vast number of beautiful species which are so characteristic a part of its flora. There was no great difficulty about this migration up and down Africa, for the continent has had an unbroken land surface for long ages, and the difficulties which a tropical climate might cause in Central Africa are got over by the presence of high mountains with a climate more to an Erica's liking.

The Protea family presents a different and somewhat harder problem. On the one hand it is so definitely southern in its distribution, and on the other the southern continents in which it occurs are so widely separated by ocean that any explanation must necessarily appear rather far-fetched. But it seems probable that Antarctica must have been part of the area inhabited by the Protea family at some warmer period, and that land connections between it and the southern

na die verskyning van die Cycadeë, was die suidelike vastelande as een, oneindige, ononderbroke landmassa met mekaar verbind. Toe kon die Cycadeë en ander voor-historiese plantegroei en dieresoorte vryelik van die een vasteland na die ander, sonder veeleisende spronge oor oseane, beweeg. Later het die vastelande ontstaan deur afsplitsing en in hul verskeie rigtings beweeg en op die plastiese binnenste van die aardbol gedrywe, en saam met hulle het hulle, soos passasierskepe hul passasiers vervoer, hul lewende vrag bestaande uit plante en diere meegevoer.

Hierdie teorie van die drywende vastelande is nie vir ons tot hulp in verband met die vraagstukke insake die verspreiding van die blomplante nie, aangesien hulle nie op die aarde verskyn het totdat die suidelike vastelande van mekaar begin wegdryf het nie. Hoe kan ons dan die teenwoordigheid van soortgelyke plante op plekke ver van mekaar geleë verklaar?

Neem byvoorbeeld die Ericas. Dit skyn asof hulle iewers in Afrika—miskien op die berge van Midde-Afrika—hul oorsprong gehad en noordwaarts na Europa en suidwaarts tot binne die Kaapprovinsie versprei en nuwe vertakkinge in die proses van verspreiding as gevolg gehad het. Ons kan ons voorstel dat die soorte wat Europa bereik het, die geharder soorte was, wat bestand was teen die veeleisende klimaatsomstandighede en waarvan die aantal beperk was. Die soorte wat suidwaarts gekom het, was toeriste, om dit so te stel, wat gelok is deur die welbekende Suid-Afrikaanse klimaat, wat hulle tesame met ons grond baie na hul sin gevind het: hulle het voorts hier posgevat en langs die kusstreke die groot aantal pragtige soorte ontwikkel wat so kenmerkend van die reeks blomsoorte is. Daar was geen moeilikheid in hierdie proses van verspreiding op en af langs Afrika nie, aangesien hierdie vasteland al eeue lank 'n ononderbroke land-oppervlakte het, en die moeilikhede wat 'n tropiese klimaat in Midde-Afrika mag veroorsaak deur die teenwoordigheid van hoë berge, met 'n klimaat meer in ooreenstemming met die Erica se geaardheid, oorbrug word. Die Protea-familie

No. 10
CHINCHERINCHEES.
ORNITHOGALUM SPP.

continents must have existed: these have now disapppeared, but whether this was caused by subsidence, the erosion of continental margins, the floating apart of continents or some other process can only be guessed at present.

Other problems of geographical distribution may be hinted at, each one of them demanding an explanation. Our Rooi Els tree has its nearest relations in the Pacific island of New Caledonia. Our Stinkwood has a related species in tropical Africa, and others in the Mascarene Islands, but most of them are in tropical America. Kissenia in South-West Africa has its only other relatives in Arabia. Parkinsonia, also in South-West Africa, has one other species in India and a few others in California and Arizona. Most of the distributions follow "normal" patterns and are capable of reasonable explanations: others seem entirely freakish. But they all show the relationships which the South African flora bears to the floras of other countries, some close and regular, others exceptional.

Plants have come into South Africa from all sides, and within this country they migrate about wherever opportunity offers. We can trace streams of migration in some cases, so that, for instance, the forests of Table Mountain appear to be the advance guard of a mass movement of forest trees from tropical Africa down through Natal and the Knysna region into the Cape Peninsula.

No. 11
WACHENDORFFIA THYRSIFLORA.

But the migration of plants from other countries into South Africa is only part of the story, and only explains the *resemblances* which our flora bears to that of other countries. How are we to account for the *differences?* The Protea family occurs in Australia, New Zealand, some of the Pacific Islands and South America as well as in South Africa, and this may be explained by migration along ancient land connections. But the actual Proteas (Figs. 30-32), Leucospermums (Figs. 26, 27), Serrurias (Fig. 33), Orothamnus (Fig. 29) and so on that we know so well occur only in Africa: and the most reasonable explanation of this is that they have come into existence here since the land connections with other southern

verteenwoordig 'n verskillende en ietwat neteliger vraagstuk. Aan die een kant is hy so beslis suidelik wat betref distribusie, en aan die anderkant is die suidelike vasteland waarop dit aangetref word deur sulke groot afstande seewater geskei dat enige verduideliking noodwendig as vergesog beskou moet word. Dog dit lyk waarskynlik dat die Suidpoolstreek deel van 'n gebied moes gewees het wat in 'n warmer tydperk deur die Protea-familie begroei moes gewees het en dat landverbindings tussen hom en die suidelike vastelande moes bestaan het; hulle het nou verdwyn, maar of dit veroorsaak is deur uitsakking, die verspoeling van die kusstreke van vastelande, die wegdrywe van vastelande of deur 'n ander proses kan slegs gegis word.

No. 12
WATER CRINUM.
CRINUM CAMPANULATUM.

Ander vraagstukke in verband met aardrykskundige distribusie kan geopper word, elkeen waarvan 'n verduideliking vereis. Die meeste van die distribusies volg 'n „normale" gang van sake en kan aanneemlik uitgelê word; ander skyn volkome „grillerig" te wees. Maar hulle openbaar almal die verwantskappe wat daar bestaan tussen die Suid-Afrikaanse plantlewe en dié van ander lande, sommige waarvan nou en gereeld, en ander waarvan baie afwykend is.

Plante het na Suid-Afrika van alle kante binnegekom en binne Suid-Afrika trek hulle rond sodra die geleentheid hom voordoen. Ons kan strome van sulke oorplanting in sommige gevalle vasstel, sodat dit by voorbeeld skyn asof die bosse van Tafelberg die voorlopers is van 'n massaverhuising van bosbome uit tropiese Afrika deur Natal en die Knysna-gebied tot in die Kaapse Skiereiland.

Maar die verspreiding van plante uit ander lande na Suid-Afrika is slegs deel van die verhaal en verklaar slegs die *ooreenstemmende* kenmerke van ons plantegroei met dié van ander lande. Hoe moet ons die *verskille* verklaar? Die Protea-familie kom in Australië, Nu-Seeland, sommige van die Stille See-eilande en Suid-Amerika, sowel as in Suid-Afrika voor, en dit kan verklaar word deur verspreiding langs oeroue landverbindings. Maar die werklike Proteas (Afb. 30-32), Leucospermums (Afb. 26, 27), Serrurias (Afb. 33), Orothamnus (Afb. 29) ens., wat ons so goed ken, kom slegs in Afrika voor: en die aanneemlikste

continents ceased to exist. Nowadays, apart from human aid, our Leucospermums, for instance, are quite unable to cross the ocean to Australia, and the Australian Grevilleas and Banksias are similarly unable to come to South Africa. We may note that Proteas themselves appear to have migrated overland northward through Africa, one species even reaching the Sudan and Erytrea: but that is a very different matter from crossing the sea.

How, then, did our special floral types originate? To answer this question would be to solve the whole series of problems summed up in the theory—or, as most biologists would say, the fact—of evolution.

No. 13
SORE EYE FLOWER.
JUSTIFINA.
CYRTANTHUS OBLIQUUS.

Consider the common sugar-bush, *Protea mellifera*, well known to all South Africans. In the western Cape there are pink-flowered ones on the Cape Flats and white-flowered ones in Bain's Kloof: take seeds from both and grow them and they will keep true: this means that there is a definite hereditary difference between the two. In the eastern Cape we also find an unmistakable sugar-bush, but its flower-heads are a darker red, their shape and that of its leaves are different, and it blooms in midsummer instead of midwinter. Plants raised from its seeds and grown side by side with the western plants maintain their distinctive characters, so that it also is a definite hereditary type. How is it that all these different varieties of sugar-bush exist and keep true?

The answer is probably given by a phenomenon known and used by gardeners—the occurrence of sports or mutations. By this is meant the sudden production of a new variety: it may be a bud-sport such as the nectarine branch which occasionally appears on a peach tree; or a seed-sport in which one or more of a batch of pure-bred seedlings may differ from its fellows, this being the origin, for instance, of most of our "double" garden flowers. These new types can often be selected and propagated, and so new garden varieties are established. The same thing may happen in nature. What causes these muta-

verklaring hiervan is dat hulle hier ontstaan het sedert die landverbindings met ander suidelike vastelande opgehou het om te bestaan. Afgesien van menslike tussenkoms is dit vir ons Leucospermums by voorbeeld heeltemal onmoontlik om die oseaan na Australië oor te steek en die Australiese Grevilleas en Banksias is op dieselfde wyse nie daartoe in staat om na Suid-Afrika te versprei nie. Ons kan daarop let dat dit skyn asof die Proteas self noordwaarts deur Afrika getrek het, sodat een soort selfs die Soedan en Eritrea bereik het: maar dit is iets heeltemal anders as om die see oor te steek.

Hoe het ons spesiale blomtipes dan ontstaan? 'n Antwoord op hierdie vraag sal die oplossing beteken van die hele reeks vraagstukke wat saamgevat word in die teorie—of, soos die meeste plantkundiges sal beweer, die feit—van evolusie.

Neem by voorbeeld die bekende suikerbos, *Protea mellifera,* wat so goed bekend is aan alle Suid-Afrikaners. In Wes-Kaapland is daar die ligrooies op die Kaapse Vlakte en die wittes in Bain's Kloof: neem die saad van albei en saai dit en hulle sal onveranderd bly: dit beteken dat daar 'n definitiewe, oorerflike verskil tussen die twee is. In Oos-Kaapland tref ons ook 'n onmiskenbare suikerbos aan dog die blomme is rooier, hul fatsoen en dié van hul blare is verskillend en hy blom in die middel van die somer i.p.v. in die winter. Plante wat van die saad daarvan gekweek is en wat naas die westelike tipes groei, behou hul onderskeidende kenmerke, sodat dit ook beslis 'n oorerflike tipe is. Hoe is dit dat al hierdie verskillende soorte suikerbosse bestaan en onveranderd bly?

No. 14
NERINA.
NERINE APPENDICULATA.

Die antwoord lê waarskynlik opgesluit in 'n verskynsel wat bekend is aan en gebruik word deur tuiniers—die aanwesigheid van afwykende vorms of mutasies. Hierdeur word bedoel die skielike verskyning van 'n nuwe soort: dit kan 'n afwykende bloeisel wees soos die kaalperske-tak wat dikwels op 'n perskeboom verskyn; of 'n saadafwyking waar een of meer klompies suiwer-gekweekte plantjies van hul metgeselle kan verskil, wat die oorsprong by voorbeeld is van die meeste

tions is now beginning to be understood by botanists, and there are indications that it may prove possible to produce them at will.

Let us take as another example two species of Cotyledon—the botterboom (*C. paniculata*) and the nentabos (*C. Wallichii*) of the Karoo. These two very distinct plants occasionally grow side by side, for instance in the Hex River Pass. When this happens one can always find a number of plants which are neither botterboom nor nentabos, but are intermediate between them. It is clear that this is due to hybridisation: the hybrids set seed almost as well as their parents, and owing to what is called segregation of characters we get in subsequent generations a large number of plants slightly differing from one another. If any of these hybrids should breed true it might be the beginning of a new species different from both of its original parents.

Hybridisation is constantly used by horticulturists as a starting point for the production of new cultivated varieties: and once again, what can happen in a garden can also happen in nature.

The gardener selects what he wants among the sports and hybrids available to him. Nature apparently does the same, according to the theory of the struggle for existence and the survival of the fit.

No. 15
BOBBEJAANTJIES.
BABIANA SPP.

Thus we have a reasonable basis for the theory of evolution. This process has been taking place among all living things, in South Africa as in all parts of the world, almost imperceptibly but producing far-reaching effects over vast periods of time.

And so, by the combination of these two processes, evolution and migration, migration and evolution, acting and interacting through immeasurable ages, Nature the great horticulturist has produced the Flora of South Africa as we know it to-day.

van ons „dubbele" tuinplante. Hierdie nuwe tipes kan dikwels uitgesoek en voortgeplant word, en so word nuwe tuinverskeidenhede tot stand gebring. Dieselfde kan in die natuur gebeur. Wat hierdie afwykings veroorsaak, begin nou deur plantkundiges verstaan te word en daar is aanduidings dat dit moontlik kan blyk om hulle na willekeur voort te bring.

No. 16
RIVERSDAL-BAKPYPIE.
RIVERSDALE BLUEBELL.
GLADIOLUS BOLUSII VAR. BURCHELLII.

Laat ons as verder voorbeeld neem twee soorte Cotyledon—die botterboom (*C. paniculata*) en die nentabos (*C. Wallichii*) van die Karoo. Hierdie twee uiters verskillende plante groei dikwels sy aan sy, b.v. in die Hexrivierpas. Wanneer dit gebeur, sal 'n mens altyd 'n aantal plante aantref wat nóg botterboom nóg nentabos, maar 'n mengsel van beide is. Dit is duidelik dat dit aan verbastering te wyte is: die basterplante skiet saad byna net so goed soos hul ouerplante, en as gevolg van wat bekend staan as die segregasie van eienskappe, tref ons in later geslagte 'n groot aantal plante aan wat effens van mekaar verskil. Indien enigeen van hierdie basters sy nuwe eienskappe oorerflik kan maak, mag dit die begin van 'n nuwe soort beteken wat verskil van albei oorspronklike ouerplante.

Verbastering word gedurig deur tuinboukundiges as 'n aanvangspunt aangewend om nuwe tuinsoorte te kweek: en nogeens, wat in 'n tuin kan gebeur, kan ook daar buite in die natuur plaasvind.

Die tuinier kies wat hy verlang uit die beskikbare mutasies en verbasterings. Die natuur doen klaarblyklik dieselfde, volgens die teorie van die stryd om die bestaan en die oorlewing van die geskikste. Derhalwe besit ons 'n billike grondslag vir die teorie van evolusie. Hierdie proses het plaasgevind onder alle lewende wesens, in Suid-Afrika sowel as in alle dele van die wêreld, bykans ongemerk, maar nogtans met verreikende gevolge oor uitgestrekte tydperke. En aldus, danksy die samewerking van hierdie twee prosesse, evolusie en verspreiding, verspreiding en evolusie, met 'n uitwerking en 'n onderlinge uitwerking van die een plant op die ander deur onmeetlike tydperke heen, het die natuur, die groot tuinier, die plantegroei van Suid-Afrika voortgebring soos ons dit vandag ken.

Classification of the South African Flora.

EVERYBODY has observed that different kinds of plants show resemblances with one another which may be greater or less in degree. These resemblances are often reflected by their popular names. For instance, there are many different plants which are called Gousblom or Daisy, all of which are recognised as having certain features in common. Botanists studying these similarities with critical care have drawn up schemes of classification, grouping together in smaller or larger classes those plants which show close or less close resemblances with one another. These classes they call species, genera and families ; and other divisions are used as well when needed.

No. 17
IXIAS.
KALOSSIES.
IXIA SPP.

These schemes of classification may be regarded as an elaborate filing or indexing system, such as is used in any large business or even in such a pursuit as stamp collecting. It is largely a matter of convenience of reference, but it must rest on some fundamental principle. If we recognise that the similarities and differences between plants are not due to mere chance, and if we enquire why different plants have features in common, we are led to one of two explanations. One is the doctrine of special

Klassifikasie van die Suid-Afrikaanse Plantegroei

ELKEEN het al opgemerk dat verskillende soorte plante in 'n meerder of minder mate met mekaar ooreenstem. Hierdie punte van ooreenstemming word dikwels deur hul populêre benamings weerspieël. Daar is by voorbeeld talryke verskillende plante wat gousblom of madeliefie genoem word, almal waarvan sekere ooreenstemmende eienskappe besit. Plantkundiges wat hierdie ooreenstemmende kenmerke met kritiese aandag bestudeer, het klassifiseringskemas ontwerp waarvolgens daardie plante wat 'n meer of minder noue ooreenstemming met mekaar openbaar, in kleiner of groter klasse gegroepeer word. Hierdie klasse noem hulle soorte, geslagte en families; en ander indelings word ook gebesig indien dit vereis word.

No. 18
UILTJIES.
PEACOCK FLOWER.
MOREA VILLOSA.

Hierdie klassifiseringskemas kan as 'n ingewikkelde rangskikkingstelsel beskou word, soos dié wat in swang is in enige groot saak of selfs in verband met liefhebberye soos die versamel van seëls; dit is grotendeels 'n saak van maklike opsporing, maar dit moet op 'n sekere fundamentele beginsel berus. As ons besef dat die ooreenstemmings en afwykings nie bloot aan toeval te wyte

creation according to some basic plan; the other is the principle of evolution. According to this latter theory, which is the one almost universally accepted by biologists, the similarities between plants mean that they are related to one another by descent and have a common ancestry; the differences mean that they have changed in the course of innumerable generations. The word "families," which was used above, alludes to this idea of relationship.

Botanists, therefore, in classifying plants are trying to arrange them in groups according to their natural relationships, as deduced from their resemblances, and they endeavour to make the filing system that they use an expression of evolutionary or family history. This branch of the science is known as Systematic Botany.

No. 19
TRITONIAS.
ROOIKALOSSIES.
TRITONIA SPP.

Many different schemes of classification have been devised, each with its own advantages and drawbacks. In the system which we are adopting here the South African flora is grouped into 178 different "Families," some containing only one or two species, others containing hundreds or even thousands. Our illustrations show examples of 45 of these families, so that they only represent about a quarter of the total. Several very important families have been omitted, as well as a large number of less important ones. In the following pages brief notes are given on 72 of the families represented in the South African flora, with references to the illustrations when these exist.

THE MOST IMPORTANT FAMILIES.

CYCADACEAE. Illustration **No. 1**

The Cycad or Kafir Bread Family. Palm-like or fern-like plants, bearing male or female cones: the former produce pollen on the lower side of the cone-scales, the latter bearing two large seeds on each cone-scale. E. Cape, Natal, E. Transvaal.

is nie, en as ons ondersoek waarom verskillende plante ooreenstemmende kenmerke besit, moet ons een van twee uitleggings aanvaar. Die een is die leer van spesiale skepping volgens 'n grondplan; die ander is die beginsel van evolusie. Volgens hierdie laasgenoemde teorie, wat feitlik universeel deur plantkundiges aanvaar word, beteken die verwante eienskappe van plante dat hulle dieselfde oorsprong gehad het en 'n gemeenskaplike voorgeslag besit; die verskille beteken dat hulle in die loop van ontelbare geslagte 'n verandering ondergaan het. Die woord „families" wat hierbo gebruik is, verwys na hierdie idee van verwantskap.

Wanneer plantkundiges dus plante klassifiseer, probeer hulle om hulle in groepe te rangskik volgens hul natuurlike verwante eienskappe op grond van ooreenstemmende kenmerke, en hulle probeer om die rangskikkingstelsel waarvan hulle hulle bedien 'n weerspieëling van die evolusie- of familiegeskiedenis te maak. Hierdie tak van die wetenskap staan bekend as plantesistematiek.

Talryke verskillende klassiferingskemas is ontwerp, elkeen met sy eie voor- en nadele. Volgens die stelsel waarvan ons ons hier bedien, word die Suid-Afrikaanse plantegroei in 178 verskillende „families" saamgevat, sommige waarvan slegs een of twee vertakkings het terwyl ander honderde of selfs duisende bevat. Ons afbeeldings toon voorbeelde van 45 van hierdie families aan sodat hulle slegs ongeveer 'n kwart van die totaal verteenwoordig. Verskeie baie belangrike families sowel as 'n groot aantal minder belangrikes is weggelaat. Op die volgende bladsye verskyn kort aantekeninge oor 72 van die families wat in die Suid-Afrikaanse plantegroei verteenwoordig word, met ververwysing na die afbeeldings waar hulle voorkom.

No. 20
GEEL PIESANG.
CRANE FLOWER.
STRELITZIA REGINAE.

DIE BELANGRIKSTE FAMILIES.

CYCADACEAE. Afbeelding No. 1 *Die Sikaïde- of Kafferbroodfamilie.* Palm- of varingagtige plante wat manlike of vroulike

No. 21
DRIP DISA.
DISA LONGICORNU.

CONIFERAE.

Illustration **No. 2**

The Conifer Family. The Yellowwoods, with male cones and solitary or paired seeds, are found in evergreen forest. The Clanwilliam Cedar and Mountain Cypresses, with small male and woody female cones, occur on open mountain slopes. W. Cape to Natal and Transvaal.

GRAMINEAE.

Illustration **No. 3**

The Grass Family. The most important family in the summer-rainfall districts, being dominant over vast areas. Comprises many hundred species, some of great pasture value. The flowers are small, often in graceful inflorescences, and are pollinated by wind.

CYPERACEAE.

The Sedge Family. Mostly occur in moist situations, but many are found on hillsides and in forest undergrowth. Flowers inconspicuous, wind-pollinated. Throughout the Union. Little pasture value.

ARACEAE. Illustration **No. 4**

The Arum Family. Includes the well-known White Arum or Pig Lily of the Cape and yellow and pink species in Natal and Transvaal. The flowers are small and are clustered on the central spadix, which is enveloped by the large coloured spathe.

RESTIONACEAE.

The Cape Reed Family. Very abundant on mountains and sand-flats and in vleis in the Cape Coastal belt. Male and female plants separate and often very unlike one another. Green stems and insignificant leaves. Wind-pollinated. Little pasture value, being typical of Cape sour-veld. Some used for thatching.

HAEMANTHUS KATHERINAE

Haemanthus Katherinae is a native of the Eastern Cape, Natal and the Eastern Transvaal. It is a very handsome plant which has been very successful in cultivation in Europe and America, the leaves reaching three feet in length and the flower-heads nine inches in diameter.

Haemanthus Katherinae is eie aan Oos-Kaapland, Natal en Oos-Transvaal. Dit is 'n pragtige plantesoort wat met groot sukses in Europa en Amerika gekweek is en waarvan die blare 'n lengte van drie voet en die blomhofies 'n middellyn van nege duim in deursnee bereik.

keëls dra : eersgenoemde bring stuifmeel op die onderkant van die keëlblaartjies voort, terwyl laasgenoemde twee groot saadpitte op elke keëlblad dra. O. Kaap, Natal, O. Transvaal.

CONIFERAE. Afbeelding **No. 2**

Die Keëldraende Familie. Die geelhout, met manlike keëls en enkelsadig of gepaarde sade, word in ewiggroen bosse aangetref. Die Clanwilliamse seder en bergsipresse, met klein manlike en houtagtige vroulike keëls, word op oop berghange aangetref. W. Kaap tot Natal en Transvaal.

GRAMINEAE. Afbeelding **No. 3**

Die Grasfamilie. Die belangrikste familie in die somer-reënvaldistrikte, waar hulle oor groot uitgestrekthede aangetref word. Behels enige honderde vertakkinge, sommige waarvan baie waardevolle weiding uitmaak. Die bloeisels is klein, dikwels baie sierlik by die oopgaan en hulle word deur die wind bestuif.

CYPERACEAE.

Die Rietgrasfamilie. Kom veral in vogtige omgewings voor, alhoewel baie soorte op heuwels en tussen gras in bosse aangetref word. Bloeisels klein en deur die wind bestuif. Dwarsdeur die Unie. Geringe weidingswaarde.

No. 22
VLEIDISA.
SWAMP DISA.
DISA RACEMOSA.

ARACEAE. Afbeelding **No. 4**

Die Arum-familie. Sluit die welbekende Aronskelk of varkblom van Kaapland en die geel of ligroos soort van Natal en Transvaal in. Die bloeisels is klein en is gegroepeer om die sentrale blomkolf wat omhul is deur die groot gekleurde blomskede.

RESTIONACEAE.

Die Kaapse Rietfamilie. Is versprei oor berge en sandvlaktes en in die vleie van die Kaapse kusstreek. Manlike en vroulike plante is apart en verskil dikwels van mekaar. Groen stamme en klein blaartjies ;

JUNCACEAE.

The Rush Family. Mostly vlei plants with small brownish flowers and bare slender green stems or grass-like leaves. The Palmiet of the Cape and Natal rivers, an unusual type, is the most conspicuous.

No. 23
POLYSTACHYA PUBESCENS.

LILIACEAE. Illustrations Nos. 5-10

The Lily Family. Includes many bulbous and tuberous plants and also many succulents. Several are conspicuous garden favourites. The flowers are usually brightly coloured with six separate perianth segments, six stamens and a superior ovary of three united carpels.

HAEMODORACEAE.

Illustration No. 11

The Bloodroot Family. Includes a few rather varied plants, of which the yellow waterside Wachendorffia and the mauve Dilatris of the Cape are conspicuous.

AMARYLLIDACEAE. Illustrations Nos. 11-14

The Amaryllis Family. Differs from the Lily Family mainly in having an inferior ovary. Includes many very conspicuous bulbous plants with large brightly-coloured flowers. Many are grown in gardens. In all the Provinces.

IRIDACEAE. Illustrations Nos. 15-19

The Ixia Family. A large Family, including many species of great beauty of form and colour, especially in the Cape coastal belt. Resting and food-storage organs usually corms or rhizomes. Perianth segments six, stamens three, ovary inferior.

MUSACEAE. Illustration No. 20

The Banana Family. Includes the true Bananas and also the Strelitzias (Crane Flowers and Wild Banana) with their bizarre form and colouring.

windbestuiwing. Van geringe weidingswaarde, aangesien dit tipies van die Kaapse suurveld is. Sommige soorte word vir rietdakke gebruik.

JUNCACEAE.
Die Biesiefamilie. Meestal vleiplante met klein bruinerige bloeisels en kaal dun groen stingels of grasagtige blaartjies. Die palmiet van die Kaapse en Natalse riviere, 'n buitengewone tipe, is die opvallendste.

LILIACEAE. Afbeeldings Nos. 5-10
Die Leliefamilie. Sluit in talryke bol- en vetplante. Baie daarvan is opvallende tuingunstelinge. Die blomme is gewoonlik helder gekleur, met ses aparte blomdelingstukke, ses meeldrade en 'n bowestandige vrugbeginsel met drie verenigde vrugblare.

HAEMODORACEAE. Afbeelding No. 11
Die Bloedwortelfamilie. Sluit in 'n paar ietwat verskillende plante waarvan die geel water-Wachendorffia en die ligpers Dilatris van die Kaap die opvallendste is.

No. 24
WITTEBOOM.
SILVER TREE.
LEUCADENDRON ARGENTEUM.

AMARYLLIDACEAE.
Afbeeldings Nos. 12-14
Die Narsinglelie-familie. Verskil van die leliefamilie hoofsaaklik weens 'n onderstandige vrugbeginsel. Sluit in talryke baie opvallende bolplante met groot, heldergekleurde blomme. 'n Groot verskeidenheid word in tuine gekweek. In al die provinsies.

IRIDACEAE. Afbeeldings Nos. 15-19
Die Klossiefamilie. Groot familie, insluitende talryke soorte wat 'n pragtige fatsoen en kleur besit, veral dié van die Kaapse kusstreek. Rus- en voedselbewaringsorgane bestaan gewoonlik uit stingelknolle of risome. Blomdek-afdelings ses, meeldrade drie, vrugbeginsel onderstandig.

MUSACEAE. Afbeelding No. 20
Die Piesangfamilie. Sluit in die opregte

No. 25
LEUCADENDRON DISCOLOR.

ORCHIDACEAE.

Illustrations **Nos. 21-23**

The Orchid Family. Both terrestrial and epiphytic Orchids occur in the Union. The flowers of some are of striking beauty, of others of smaller size but of remarkable and complex form, unsurpassed for curiosity in any other Family. Mainly in the coastal and forest areas, some in grass-veld.

MORACEAE.

The Fig Family. Several species in South Africa, mostly trees with milky latex. The Fig fruit is composed of a soft hollow receptacle with a small opening at the tip, bearing numerous minute flowers on its inner surface.

URTICACEAE.

The Nettle Family. The Nettles and some others of this Family are well-known for their stinging hairs. Includes several South African plants, herbs or woody, with inconspicuous flowers.

PROTEACEAE. Illustrations **Nos. 24-33**

The Protea Family. Mostly shrubs and a few trees, specially characteristic of the "Cape" flora in the coastal mountains and plains. The individual flowers are of similar structure in all cases, but they are grouped together in a great variety of different ways so that the type of inflorescence is extremely varied. Includes many magnificent and highly distinctive species.

LORANTHACEAE.

The Mistletoe Family. Rootless semi-parasitic plants attached to and deriving part of their nourishment from various trees and shrubs. Loranthus has often brightly coloured flowers; Viscum has attractive fleshy berries.

piesangs sowel as die strelitzias (kraanvoëlblom en wilde piesang) met hul fantastiese vorm en kleur.

ORCHIDACEAE. Afbeeldings Nos. 21-23

Die Orgideefamilie. Sowel grond- as epifitiese orgideë word in die Unie aangetref. Die bloeisels van sommige is baie mooi, dié van ander is kleiner, dog hulle besit 'n interessante en ingewikkelde vorm wat in belangwekkendheid nie deur enige ander familie oortref word nie. Hoofsaaklik in die kus- en bosstreke ; sommige in grasveld.

MORACEAE.

Die Vyfamilie. Verskeie soorte in Suid-Afrika ; hoofsaaklik bome met melksap. Die vy bestaan uit 'n sagte hol behouer met 'n klein opening aan die punt, en met talryke klein bloeisels op die binnekantste oppervlakte.

URTICACEAE.

Die Brandnetelfamilie. Die brandnetel en ander vertakkings van hierdie familie is goed bekend weens hul stekelige hare. Sluit in verskeie Suid-Afrikaanse plante, sag of houterig, met klein bloeisels.

PROTEACEAE. Afbeeldings Nos. 24-33

Die Suikerbos- of Proteafamilie. Meestal struike en 'n paar soorte bome, veral kenmerkend van die „Kaapse" plantegroei op die berge en vlaktes van die kusstreek. Die individuele bloeisels besit in alle gevalle 'n soortgelyke vorm, dog hulle is op 'n groot aantal verskillende maniere gegroepeer, met die gevolg dat die bloeiwyse besonder uiteenlopend is. Sluit talryke pragtige en baie kenmerkende soorte in.

No. 26
LUISIES.
PINCUSHIONS.
LEUCOSPERMUM NUTANS.

LORANTHACEAE.

Die Voëlent-familie. Wortellose, halfparasitiese plante,

SANTALACEAE.

The Cape Sumach Family. Mostly partly parasitic below ground on the roots of other plants. They usually have greenish stems, small or scale-like leaves and insignificant flowers.

CHENOPODIACEAE.

The Ganna Family. Shrubs and herbs, mostly with inconspicuous flowers, found specially in brak soils and as weeds of cultivation.

AMARANTACEAE.

The Amaranth Family. A varied Family, mostly herbs and shrubs, with somewhat inconspicuous scaly, woolly or spiny inflorescences. Mostly in semi-desert localities and as weeds of cultivation.

No. 27
LEUCOSPERMUM REFLEXUM.

AIZOACEAE. Illustrations **Nos. 34, 35**

The Sour Fig Family. Includes the enormous Mesembryanthemum group, all more or less succulent, often with brilliant flowers, found mainly in sand-veld, karoo and semi-desert. Also includes a number of other less conspicuous plants of sandy and saline soils.

CARYOPHYLLACEAE.

The Carnation Family. There are several species of Pink (Dianthus) native in the Union. The Family also includes some familiar weeds of cultivation. (Spurrey, Chickweed, etc.)

NYMPHAEACEAE. Illustration **No. 36**

The Water Lily Family. Well-known aquatic plants with floating leaves and showy flowers (blue or mauve in the South African species.)

RANUNCULACEAE. Illustration **No. 37**

The Buttercup Family. Includes several familiar plants such as Anemone, Clematis and Ranunculus, all of which genera occur also in Europe, though the species are distinct.

wat geheg is aan, en 'n deel van hul voeding put uit, verskillende soorte bome en struike. Die Loranthus besit dikwels helder-gekleurde bloeisels ; voëlent (viscum) besit aantreklike vlesige bessies.

SANTALACEAE.

Die Kaapse Sumakfamilie. Gewoonlik gedeeltelik parasities onder die grond, op die wortels van ander plante. Hulle besit gewoonlik groenerige stamme, klein of skaalagtige blaartjies en onbeduidende bloeisels.

CHENOPODIACEAE.

Die Ganna-familie. Bossies en struike, gewoonlik met klein bloeisels word veral in brak grond en as onkruid op beboude grond aangetref.

AMARANTACEAE.

Die Amarantfamilie. 'n Uiteenlopende familie, hoofsaaklik bossies en struike, met ietwat onopvallende, skaalagtige, wollerige of doringagtige bloeisels. Meestal in half-woestynagtige streke en as onkruid op lande.

No. 28
STOMPIE.
MIMETES LYRIGERA.

AIZOACEAE. Afbeeldings **Nos. 34, 35**

Die Suurvyfamilie. Sluit die reusagtige mesembryanthemum-groep in, wat grotendeels uit vetplante bestaan, dikwels kleurryke bloeisels besit en hoofsaaklik in sandveld, Karoowêreld en halfwoestynagtige streke aangetref word. Sluit ook 'n aantal ander minder opvallende plante van sanderige en brak grond in.

CAROPHYLLACEAE.

Die Angelierfamilie. Daar is verskeie soorte grasangeliere (Dianthus) wat eie is aan die Unie. Die familie sluit ook enige bekende onkruidtipes op bewerkte grond in (Sporrie, Murik, ens.)

NYMPHAEACEAE.

Afbeelding **No. 36**

Die Waterleliefamilie. Bekende waterplante

CRUCIFERAE. Illustration **No. 38**

The Cabbage Family. Includes one large native genus, Heliophila, some annual species of which, (known erroneously as "flax"), with blue flowers are conspicuous in the Western sand-veld in spring; and several smaller genera; also many introduced weeds of cultivation, *e.g.* Radish and Shepherd's Purse.

DROSERACEAE.

The Sundew Family. Remarkable insect-catching plants. Small flies, etc., are trapped by the sticky tentacles on the leaves, which in many cases digest and absorb their victims.

CRASSULACEAE. Illustrations **Nos. 39, 40**

The Crassula Family. A large number of succulents are included under the genera Crassula, Cotyledon, etc., mostly growing in karoo and semi-desert areas. Flowers small in Crassula, but usually showy in Cotyledon and Rochea.

BRUNIACEAE. Illustration **No. 41**

The Brunia Family. Characteristic of the "Cape" flora. Shrubs, often with spherical knob-like inflorescences, but other forms are frequent.

ROSACEAE.

The Rose Family. The largest South African genus is Cliffortia, which consists of numerous shrubby species of diverse forms with insignificant male and female flowers, which are wind-pollinated and very unlike a Rose!

No. 29
MARSH ROSE.
OROTHAMNUS ZEYHERI.

LEGUMINOSAE.

Illustrations **Nos. 42-48**

The Pea Family. A vast Family, well represented in all parts of the Union. The fruit, a pod or legume, is characteristic of the Family, the flowers of which vary widely. Most species have the well-known pea type of flower, but the

met drywende blare en opvallende blomme (die Suid-Afrikaanse soorte is blou of ligpers).

No. 30
GROOT WOLLERIGE SUIKERBOS.
BIG WOOLY PROTEA.
PROTEA BARBIGERA.

RANUNCULACEAE.
Afbeelding **No. 37**

Die Botterblomfamilie. Sluit verskeie bekende plante in soos die windroos, lemoenopklim en ranonkel, waarvan verwante vorms ook in Europa voorkom, alhoewel die soorte verskil.

CRUCIFERAE. Afbeelding **No. 38**

Die Koolfamilie. Sluit een groot inheemse soort, die sonplant (heliophilia), waaronder 'n paar jaarlikse soorte wat (verkeerdelik bekend as „vlas") met blou blomme opvallend is in die Westelike sandveld gedurend die lente, en verskeie kleiner soorte; ook talryke ingevoerde onkruidplante, b.v. wilde radys en Capsella bursa pastoris.

DROSERACEAE.

Die Snotblomfamilie. Merkwaardige insektevangende plante. Klein vliegies, ens., word deur die klewerige haartjies op die blare gevang, wat in baie gevalle hul slagoffer verteer en absorbeer.

CRASSULACEAE. Afbeeldings **Nos. 39, 40**

Die Klipblomfamilie. 'n Groot aantal vetplante word saamgevat onder die geslag klipblom, Cotyledon, ens., die meeste waarvan in die Karoo en half-woestynagtige streke groei. Die bloeisels van die klipblomfamilie is klein, dog gewoonlik opvallend in die geval van die Cotyledon en Rochea.

BRUNIACEAE. Afbeelding **No. 41**

Die Bruniafamilie. Kenmerkend van die Kaapse plantegroei. Struike, dikwels met sfeervormige, knoppiesagtige bloeisels, dog ander vorms kom dikwels voor.

Acacia group has small flowers in dense globular or elongated clusters, and the Bauhinia group is also distinct. The Family includes herbs, shrubs, trees, climbers, etc. Many are of great economic value.

GERANIACEAE. Illustration **No. 49**
The Geranium Family. The most important South African genus is Pelargonium, with many species, often decorative, the origin of several familiar garden plants.

OXALIDACEAE. Illustrations **Nos. 50, 51**
The Sorrel Family. Oxalis is a very large South African genus, mainly in the South-West Cape. Herbs with bulbous storage-organs and often brightly coloured delicate flowers produced in winter and early spring.

No. 31
BOT RIVER PROTEA.
BOTRIVIER-SUIKERBOS.
PROTEA COMPACTA.

RUTACEAE. Illustration **No. 52**
The Buchu Family. A large Family, characteristic of the "Cape" flora, most species being shrubs with aromatic leaves. Some Buchus are used in official and patent medicines. The Family also includes the beautiful Cape Chestnut (Calodendron) and the introduced Citrus fruits.

MELIACEAE. Illustration **No. 53**
The Sneezewood Family. Includes several well-known South African trees, *e.g.* the Sneezewood with very durable timber, the Dog Plum, the Cape Mahogany, etc., and also the very decorative Chinese Lantern Tree or Klapperbos from the Swartberg, etc.

POLYGALACEAE. Illustration **No. 54**
The Polygala Family. Includes two large genera, Polygala and Muraltia, both with superficially pea-like and usually purple flowers. Found in all Provinces, but rare in the arid regions.

ROSACEAE.

Die Roosfamilie. Die grootste Suid-Afrikaanse soort is die Cliffortia, wat uit talryke struikagtige en uiteenlopende vorms bestaan, met klein manlike en vroulike bloeisels wat deur die wind bestuif word en baie min na 'n roos lyk.

LEGUMINOSAE Afbeeldings **Nos. 42-48**

Die Ertjiefamilie. 'n Groot familie wat goed verteenwoordig is in alle dele van die Unie. Die vrug, 'n peul, is kenmerkend van die familie, die blomme waarvan baie uiteenlopend is. Die meeste soorte besit die bekende ertjiebloeisel, dog die Acacia-groep besit klein bloeisels in dik globaalvormige of verlengde trosse, en die Bauhinia-groep is ook verskillend. Die familie sluit in bossies, struike, bome, klimop, ens. Baie daarvan is van groot ekonomiese waarde.

GERANIACEAE. Afbeelding **No. 49**

Die Malvafamilie. Die belangrikste Suid-Afrikaanse soort is die Pelargonium, met baie vertakkings, dikwels baie mooi, die oorsprong van talryke bekende tuinplante.

No. 32
PROTEA GRANDICEPS.

OXALIDACEAE.

Afbeeldings **Nos. 50, 51**

Die Suringfamilie. Wilde suring is 'n baie groot Suid-Afrikaanse soort, hoofsaaklik in Suidwes-Kaapland. Bossies met bolagtige opgaringsorgane en dikwels opvallende, delikate blomme wat in die winter en vroeë lente voorkom.

RUTACEAE. Afbeelding **No. 52**

Die Boegoefamilie. 'n Groot familie, kenmerkend van die Kaapse plantegroei, waarvan die meeste soorte struike met geurige blare is. Sommige boegoesoorte word vir die bereiding van mediese stowwe en patente medisyne gebruik. Die familie sluit ook in die pragtige Kaapse kastaiing (Calodendron) en die ingevoerde sitrusvrugte.

EUPHORBIACEAE.
The Milkbush Family. A very large Family of varied habit from trees to annual herbs. Euphorbia, the largest genus, is chiefly composed of succulents, some of great stature, occurring in a wide range of habitat from desert to bush-veld. Latex is copiously present, often with a high rubber content and frequently poisonous qualities.

ANACARDIACEAE.
The Taaibos Family. Includes the large genus Rhus, found all over the Union, consisting of trees and shrubs with insignificant flowers, and also several other well-known trees (Kafir Plum, Maroola, Kliphout, etc.).

CELASTRACEAE.
The Saffraan Family. Mostly evergreen trees with small white or greenish flowers —for instance, the Saffronwood, Pendoring, Hottentot Cherry, etc.

MELIANTHACEAE. Illustration **No. 55**
The Kruidjie-roer-my-nie Family. A small Family, containing the well-known Melianthus and also the handsome red-flowered Greyias of the Drakensberg.

No. 33
BLUSHING BRIDE.
TROTS VAN FRANSCHHOEK.
SERRURIA FLORIDA.

RHAMNACEAE.
The Cat-thorn Family. Contains one large genus of shrubs (Phylica) with small white flowers mostly in heads, and a few thorny shrubs (Zizyphus, Scutia, etc.).

VITACEAE.
The Vine Family. Includes several tendril-climbers (Wild Grape, Monkey Rope) and also the remarkable thick-stemmed species of Cissus (Botterboom) from South-West Africa.

MALVACEAE. Illustration **No. 56**
The Mallow Family. Mostly shrubs and

MELIACEAE.

Afbeelding **No. 53**

Die Nieshoutfamilie. Sluit verskeie bekende Suid-Afrikaanse boomsoorte in, b.v. die nieshout met uiters duursame timmerhout, die hondepruim, die Kaapse Mahoniehout, ens., en ook die baie aantreklike Chinese Lanternboom of klapperbos van die Swartberg, ens.

No. 34
VYGIES.
SOUR FIGS.
MESEMBRYANTHEMUM SPP.

POLYGALACEAE.

Afbeelding **No. 54**

Die Melkkruidfamilie. Sluit in twee groot geslagte, melkkruid en muraltia, albei met (oppervlakkig beskou) ertjievormige en gewoonlik pers bloeisels. In al die provinsies aangetref, maar seldsaam in die droë streke.

EUPHORBIACEAE.

Die Melkbosfamilie. 'n Baie groot familie van uiteenlopende soorte vanaf bome tot jaarplante. Euphorbia, die grootste geslag, bestaan hoofsaaklik uit vetplante, sommige waarvan baie groot is, en wat in gebied wat sowel woestyn as bosveld dek, aangetref word. Melksap is oorvloedig en besit dikwels 'n hoë rubberinhoud ; dikwels is dit giftig.

ANACARDIACEAE.

Die Taaibosfamilie. Sluit die groot familie rhus in, dwarsdeur die Unie aangetref, bestaande uit bome en struike met klein bloeisels, sowel as verskeie ander bekende bome (Kafferpruim, Maroela, Kliphout, ens.).

CELASTRACEAE.

Die Safraanfamilie. Meestal ewiggroen bome met klein wit of groenerige bloeisels, b.v. die Safraanhout, Pendoring, Hottentotskersie, ens.

MELIANTHACEAE. Afbeelding **No. 55**

Die Kruidjie-roer-my-nie-familie. 'n Klein familie wat die bekende heuningblom en ook die pragtige rooiblom-greyias van die Drakensberg insluit.

trees with large delicate flowers, for instance Hibiscus, the Mallows, the Cotton plant, etc.

STERCULIACEAE.
The Sterculia Family. Dombeya with a few species of beautiful flowering trees, and Hermannia, a large genus of small shrubs mostly with yellow hanging twisted flowers, are the chief South African representatives.

OCHNACEAE. Illustration **No. 57**
The Cape Redwood Family. Ochna, the only South African genus, includes a few species of handsome evergreen trees with bright yellow flowers and curious black berry fruits on a bright red receptacle.

No. 35
STONE PLANT.
TOONTJIE.
LITHOPS LESLIEI.

FLACOURTIACEAE.
Includes some well-known trees such as the Wild Peach (Kiggelaria), the Kei Apple (Dovyalis) with an edible fruit, and the Red Pear (Scolopia).

BEGONIACEAE. Illustration **No. 58**
The Begonia Family. Several species of Begonia, a genus familiar in cultivation, occur wild in the eastern Transvaal, Natal and the Transkei.

PENAEACEAE.
The Penaea Family. A Family of shrubs confined to the Cape coastal belt and mountains · some are handsome, *e.g.* Brachysiphon and Sarcocolla.

THYMELAEACEAE. Illustration **No. 59**
The Daphne Family. A large Family of shrubs, some insignificant, others of considerable beauty, *e.g.* the Mountain Aster (Lachnea) of the Cape and the Kannabast (Dais) of the Eastern districts of the Union.

NERINA

NERINE SARNIENSIS

NERINA

Nerine sarniensis is one of the most beautiful of our wild flowers and is known in a number of exquisite colour-varieties. It grows on moist and shady rock-ledges on several of the mountains of the South-Western Cape, and flowers in March and April. It has been much grown in gardens overseas.

Nerine sarniensis is een van die pragtigste soorte veldblomme en word in 'n reeks voortreflike kleure aangetref. Dit groei op vogtige en beskutte lyste van kranse op verskeie berge van Suidwes-Kaapland en blom in Maart en April. Dit is op 'n groot skaal in tuine oorsee gekweek.

RHAMNACEAE.
Die Katdoringfamilie. Bevat een groot familie struike (Phylica) met klein wit bloeisels meestal in klompies, en 'n paar doringagtige struike (Zizyphus, Scutia, ens.).

VITACEAE.
Die Wynstokfamilie. Sluit verskeie ranksoorte in (wilde druiwe, bobbejaantou) sowel as die merkwaardige dikstammige soort Cissus (botterboom) van Suidwes-Afrika.

MALVACEAE. Afbeelding **No. 56**
Die Kiesieblaarfamilie. Meestal struike en bome met groot sierlike bloeisels, b.v. vuurblom (Hibiscus), die kiesieblaar, die katoenplant, ens.

No. 36
WATERLELIE.
WATER LILY.
NYMPHAEA STELLATA.

STERCULIACEAE.
Die Sterculia-familie. Dombeya, met 'n paar soorte pragtige bome wat bloeisels dra, en Hermannia, 'n groot reeks klein struike meestal met geel, hangende, gedraaide bloeisels, is die vernaamste Suid-Afrikaanse soorte.

OCHNACEAE. Afbeelding **No. 57**
Die Kaapse Rooihoutfamilie. Ochna, die enigste Suid-Afrikaanse soort, sluit in 'n paar soorte pragtige ewiggroen bome met helder geel bloeisels en eienaardige swart bessies met 'n helder rooi dop.

FLACOURTIACEAE.
Sluit in 'n paar bekende bome soos die wilde perske (Kiggelaria), die keiappel (Dovyalis) met 'n eetbare vrug en die rooi peer (Scolopia).

BEGONIACEAE. Afbeelding **No. 58**
Die Begonia-familie. Verskeie soorte Begonia, 'n geslag wat bekend is in die tuinbou, word wild aangetref in Oos-Transvaal, Natal en die Transkei.

UMBELLIFERAE.

The Carrot Family. A distinctive herbaceous Family, mostly with small greenish or white flowers in umbels. Includes the Wild Aniseed (Annesorhiza), the Blister Bush or Wild Celery (Peucedanum) and many other aromatic plants; also several familiar kitchen garden plants, *e.g.* Carrot, Parsnip, Parsley, Celery, etc.

ERICACEAE. Illustrations **Nos. 60-67**

The Heath Family. One of the best-known South African Families with many hundreds of species of Heaths (Erica and other genera), mainly in the Cape coastal belt, with some in the Drakensberg. The flowers, though relatively small, are produced in great numbers and are remarkable for their beauty of detailed form and colour.

PLUMBAGINACEAE. Illustrations **Nos. 68, 69**

The Plumbago Family. Includes familiar plants such as the blue Plumbago, abundant in the Eastern Cape, and the mainly coastal Sea Lavenders (Statice).

EBENACEAE.

The Ebony Family. Several shrubs and small trees found all over the Union, of which the Guarri of the Karoo (Euclea) and various species of Royena are familiar.

OLEACEAE. Illustration **No. 70**

The Olive Family. The genus Olea includes the Wild Olive and the Black Ironwood, a fine timber tree: the sweet-scented Jasmines also belong to this Family.

LOGANIACEAE.

The Sagewood Family. Here belongs the Vlier (Nuxia), an ornament of the evergreen forests, the Sagewoods (Buddleia) with their strong characteristic scent, and the Kafir Oranges (Strychnos).

No. 37
CAPE ANEMONE.
ANEMOON.
ANEMONE CAPENSIS.

No. 38
BLOU RIET.
WILD STOCK.
BRACHYCARPAEA VARIANS.

PENAEACEAE.

Die Penaea-familie. 'n Familie struike wat beperk is tot die Kaapse kusstreke en berge: sommige daarvan is pragtig soos b.v. Brachysiphon en Sarcocolla.

THYMELAEACEAE

Afbeelding No. 59

Die Daphne-familie. 'n Groot familie struike, sommige waarvan onopvallend, ander pragtig is, soos b.v. die bergaster (Lachnea) van die Kaap en die Kannabast (Dais) van die Oostelike distrikte van die Unie.

UMBELLIFERAE.

Die Geelwortelfamilie. 'n Opvallende bossieagtige familie, meestal met klein groenerige of wit bloeisels in skerms. Sluit in die wilde anys (Annesorhiza), die wilde seldery (Peucedanum) en baie ander soorte geurige plante: ook verskeie bekende groentesoorte, b.v. geelwortel, witwortel, pieterselie, seldery, ens.

ERICACEAE. Afbeeldings Nos. 60-67

Die Heidefamilie. Een van die bekendste Suid-Afrikaanse families, met baie honderde soorte heide (Erica en ander soorte), hoofsaaklik in die Kaapse kusstreek met sommige in die Drakensberg. Alhoewel die blomme betreklik klein is, kom hulle in groot getalle voor en is hulle bekend weens die prag van hul verskillende vorm en kleur.

PLUMBAGINACEAE. Afbeeldings Nos. 68, 69

Die Plumbago-familie. Sluit bekende plante in soos die blou Plumbago, in oorvloed in die oostelike Kaap, en die see-leventel (Statice) hoofsaaklik van die kusstreek.

EBENACEAE.

Die Ebbehoutfamilie. Verskeie struike en klein boompies word dwarsdeur die Unie aangetref, waarvan die ghwarrie van die Karoo (Euclea) en verskeie

GENTIANACEAE. Illustration No. 71

The Gentian Family. Includes the large genera Chironia and Sebaea, mostly herbaceous plants with bright pink or yellow flowers in the coastal districts.

APOCYNACEAE. Illustration No. 72

The Periwinkle Family. The Amatungulu (Carissa) with edible fruits, the Bushman's Poison (Acokanthera) with highly poisonous fruits, and the naturalised Periwinkles (Vinca), blue, white and red, are well known.

ASCLEPIADACEAE. Illustrations Nos. 73, 74

The Stapelia Family. Includes many highly remarkable succulents (Stapelia, Caralluma, Tavaresia, Trichocaulon, etc.), the climbing Ceropegias with flowers of varied and fantastic shape, and also a large number of climbing and herbaceous plants. Throughout the Union.

CONVOLVULACEAE.

The Morning Glory Family. In addition to the showy climbing Ipomoea and Convolvulus this Family also contains the thread-like leafless small-flowered parasite the Dodder (Cuscuta).

No. 39
HONDEOOR.
COTYLEDON ORBICULATA.

BORAGINACEAE. Illustration No. 75

The Forget-me-not Family. The genera Myosotis (Forget-me-not), Anchusa (Cape Forget-me-not) and Lobostemon (Achtdag-genees-bos) are familiar.

VERBENACEAE.

The Verbena Family. Includes numerous herbs, shrubs and trees found throughout the Union, few of which, however, have distinctive or showy flowers.

LABIATAE. Illustrations Nos. 76, 77

The Sage Family. A large Family in South Africa, often aromatic herbs with opposite leaves and square stems. The Wilde Dagga (Leonotis), the Mints (Mentha),

soorte Royena die bekendste is.

OLEACEAE.

Afbeelding No. 70

Die Olyffamilie. Die Oleageslag sluit in die wilde olyf en die swart ysterhout, 'n uitstekende timmerhout: die geurige jasmyn behoort ook aan hierdie familie.

No. 40
KEISERSKROON.
RED CRASSULA.
ROCHEA COCCINEA.

LOGANIACEAE.

Die Saliehoutfamilie. Hieraan behoort die vlier (Nuxia), 'n pragstuk van die ewiggroen bosse, die saliehout (Buddleia) met hul sterk kenmerkende geur, en die kafferlemoen (Strychnos).

GENTIANACEAE. Afbeelding No. 71

Die Gentiaan-familie. Sluit in die groot geslagte Chironia en Sebaea, meestal bossieagtige plante met helder ligroos of geel bloeisels in die kusdistrikte.

APOCYNACEAE. Afbeelding No. 72

Die Maagdepalmfamilie. Die Amantungulu (Carissa) met eetbare vrugte, die boesmansgif (Acokanthera) met uiters giftige vrugte en die genaturaliseerde maagdepalm (Vinca) blou, wit en rooi is goed bekend.

ASCLEPIADACEAE. Afbeeldings Nos. 73, 74

Die Stapelia-familie. Sluit in talryke uiters interessante vetplante (Stapelia, Caralluma, Tavaresia, Trichocaulon, ens.), die rankende Ceropegias met blomme van uiteenlopende en fantastiese fatsoen en ook 'n groot aantal rank- en kruidagtige plante. Dwarsdeur die Unie.

CONVOLVULACEAE.

Die Purper-windefamilie. Behalwe die opvallende rankende Ipomoea en Convolvulus, bevat hierdie familie ook die draadagtige, blaarlose parasiet, die dodder (Cuscuta) met klein bloeisels.

and the various Sages (Salvia) are examples. Several introduced species are used as pot-herbs.

No. 41
KOLKOL.
BERZELIA ABROTANIFOLIA

SOLANACEAE.

The Potato Family. Various species of Solanum occur (Apple of Sodom, Nightshade, etc.), and several species of Lycium are thorny shrubs of arid localities. Here belong many familiar naturalised plants such as the Cape Gooseberry (Physalis), the Stinkblaar (Datura) and the Wild Tobacco (Nicotiana): also such important economic plants as the Tomato, Potato and Tobacco.

SCROPHULARIACEAE. Illustrations **Nos. 78-81**

The Snapdragon Family. A Family of numerous genera and a large number of species, especially in the genera Nemesia and Sutera. Some are total root-parasites, such as Harveya, of which there are many striking species, and Hyobanche. The Family occurs in all parts of the Union.

BIGNONIACEAE. Illustrations **Nos. 82-84**

The Kafir Honeysuckle Family. Includes several handsome climbers, e.g. the Port St. Johns Creeper (Podranea) and the Kafir Honeysuckle (Tecomaria), as well as the shrubby Driedooring (Rhigozum) of the Karroid districts.

PEDALIACEAE. Illustration **No. 85**

The Sesame Family. Mostly herbaceous plants of the central districts, often with spiny or winged fruits, adapted for dispersal by animals or the wind: the fruit of the Grapple Plant (Harpagophytum) is specially formidable.

GESNERACEAE. Illustration **No. 86**

The Gloxinia Family. One genus, Streptocarpus, in South Africa. Often epiphytic on tree trunks or on moist rocks in summer rainfall districts. Some

BORAGINACEAE. Afbeelding No. 75

Die Vergeet-my-nietjie-familie. Die geslag Myosotis (vergeet-my-nietjie), Anchusa (Kaapse vergeet-my-nietjie) en Lobostemon (agdag-geneesbos) is goed bekend.

VERBENACEAE.

Die Verbena-familie. Sluit in talryke plantjies, struike en bome wat dwarsdeur die Unie aangetref word, min waarvan egter opvallende of mooi bloeisels besit.

LABIATAE. Afbeeldings Nos. 76, 77

Die Saliefamilie. 'n Groot familie in Suid-Afrika, dikwels geurige kruiesoorte met teenoorstaande blare en vierkantige stingels. Die wilde dagga (Leonotis), die kruisementsoorte (Mentha) en die verskillende soorte salie (Salvia) is voorbeelde. Verskeie ingevoerde soorte word vir die krui van voedsel gebruik.

SOLANACEAE.

Die Aartappelfamilie. Verskeie soorte Solanum kom voor (sodomsappel, nastergal, ens.) en verskeie soorte Lycium is doringagtige struike in droë streke. Hiertoe behoort talryke bekende genaturaliseerde plante soos die Kaapse appelliefie (Physalis), die stinkblaar (Datura) en die wilde tabak (Nicotiana): ook plante van groot ekonomiese belang soos die tamatie, aartappel en tabak.

SCROPHULARIACEAE.

Afbeeldings Nos. 78-81

Die Leeubekkiefamilie. 'n Familie van talryke soorte en met 'n groot reeks vertakkings, veral in die geslagte Nemesia en Sutera. Sommige is heeltemal wortelparasiete, soos Harveya, waarvan daar talryke treffende soorte bestaan, en Hyobanche. Die familie word dwarsdeur die Unie aangetref.

BIGNONIACEAE.

Afbeeldings Nos. 82-84

Die Kaffer-kamperfoelie. Sluit in talryke pragtige klimopsoorte, b.v. die Port St. Johns-

No. 42
PRIDE OF DE KAAP.
BAUHINIA GALPINII.

species have only one leaf which grows continuously throughout life. Some species and hybrids are favourite greenhouse plants.

ACANTHACEAE. Illustration **No. 87**

The Acanthus Family. A large Family of shrubs and herbs occurring throughout the Union except in the south-west Cape. Many have spinous leaves and inflorescences. Some have showy flowers (e.g. Thunbergia, Mackaya).

RUBIACEAE. Illustrations **Nos. 88-90**

The Gardenia Family. This large Family includes some of our most beautiful trees and shrubs, e.g. Alberta from the Transkei and Natal, the Buffelshoorn (Burchellia) from the forests, the Katjepiering (Gardenia) with sweet-scented flowers, and also several other handsome forest trees and shrubs. In the Cape coastal belt, however, the Family is chiefly represented by a number of small shrubs with insignificant wind-pollinated flowers. (Anthospermum.)

DIPSACEAE. Illustration **No. 91**

The Scabious Family. The small flowers are massed in showy heads resembling those of certain Compositae, but easily distinguished by the free stamens.

No. 43
BUSH TEA.
HEUNINGTEE.
CYCLOPIA GENISTOIDES.

CUCURBITACEAE.

The Gourd Family. The South African members of this Family include various gourds, cucumbers, melons and other tendril-climbers, and also the remarkable "Nara" of the S.W. African deserts.

CAMPANULACEAE.

Illustrations **Nos. 92, 93**

The Campanula Family. Mostly herbs or small shrubs, often with blue flowers, some being regular in form (Roella, Wahlenbergia), others irregular (Lobelia, Cyphia). Distributed throughout the Union.

klimop (Podranea) en die kaffer-kamperfoelie (Tecomaria) sowel as die struikagtige Driedoring (Rhigozum) van die Karoodistrikte.

PEDALIACEAE. Afbeelding No. 85
Die Sesamkruidfamilie. Meestal bossieagtige plante van die sentrale distrikte, dikwels met doringagtige of gevleuelde saad, wat so toegerus is dat hulle deur diere of die wind versprei kan word: die vrug van die rankdoring (Harpagophytum) is veral gedug.

GESNERACEAE. Afbeelding No. 86
Die Gloxinia-familie. Een soort, Streptocarpus, in Suid-Afrika. Dikwels epifities op die stamme van bome of op vogtige rotse in somerreënvalstreke. Sommige soorte het slegs een blaar wat dwarsdeur hul bestaan groei. Sommige soorte en bastersoorte is gewilde broeikasplante.

No. 44
ERYTHRINA HUMEANA.

ACANTHACEAE. Afbeelding No. 87
Die Akantfamilie. 'n Groot familie struike en kruie wat dwarsdeur die Unie, behalwe in Suidwes-Kaapland, voorkom. Baie van hulle besit doringagtige blare en bloeisels. Sommige daarvan besit pragtige bloeisels (b.v. Thunbergia, Mackaya).

RUBIACEAE. Afbeeldings Nos. 88-90
Die Katjiepieringfamilie. Hierdie groot familie sluit in sommige van ons pragtigste bome en struike, b.v. Alberta van die Transkei en Natal, die buffelshoring (Burchellia) van die bosse, die katjiepiering (Gardenia) met welriekende blomme en ook verskeie ander pragtige bosbome en struike. In die Kaapse kusstreek word die familie egter hoofsaaklik deur 'n klein aantal struikies met klein bloeisels (Anthospermum), wat deur die wind bestuif word, verteenwoordig.

DIPSACEAE. Afbeelding No. 91
Die Scabiosa-familie. Die klein bloeisels kom voor in mooi hofies wat lyk soos

COMPOSITAE.

Illustrations Nos. 94-100

The Daisy Family. A vast Family, the largest in the world, and abundantly represented in South Africa, occurring in all parts of the country. Regarded by botanists as being the most highly evolved Family of the whole plant kingdom. A high proportion of the species are shrubs, others being herbaceous. The individual flowers are usually small, but conspicuousness is often achieved by the massing together of numerous florets in a common involucre. The Family includes the showy genera Gazania, Arctotis, Gerbera, Venidium, Ursinia, etc., and also plants with inconspicuous flowers such as the Rhenoster Bush (Elytropappus), and the Slangbos (Stoebe). Other well-known plants are the innumerable Everlastings (Helichrysum, Phoenocoma, etc.), and the even more numerous Groundsels (Senecio). Moreover, many familiar introduced weeds belong here, e.g. various Thistles (Sonchus, Cnicus, Silybum, Centaurea), the Burweed (Xanthium), the Khakibush (Tagetes), etc.

No. 45
MOUNTAIN DAHLIA.
GEELKOP.
LIPARIA SPHERICA

sekere soorte Compositae, maar wat maklik uitgeken kan word weens hul meeldrade.

CUCURBITACEAE.

Die Pampoenfamilie. Die Suid-Afrikaanse lede van hierdie familie sluit in verskillende soorte pampoene, komkommers, waatlemoene en ander soorte rankklimop, sowel as die merkwaardige „Nara" van die Suidwes-Afrikaanse woestyne.

CAMPANULACEAE. Afbeeldings **Nos. 92, 93**

Die Klokkiesblomfamilie. Meestal kruie of klein struikies, dikwels met blou bloeisels, sommige waarvan 'n reëlmatige vorm besit (Roella, Wahlenbergia), ander onreëlmatig (Lobelia, Cyphia). Dwarsdeur die Unie aangetref.

COMPOSITAE. Afbeeldings **Nos. 94-100**

Die Madeliefiefamilie. 'n Reuse-familie, die grootste in die wêreld en wat ruimskoots in Suid-Afrika verteenwoordig word ; word dwarsdeur die land aangetref. Plantkundiges meen dat hierdie familie die hoogs ontwikkelde reeks van die hele plante-koninkryk is. 'n Hoë persentasie van hierdie soort is struike terwyl ander soorte kruie is. Die individuele bloeisels is gewoonlik klein, dog dikwels is hulle opvallend weens die groepering van talryke klein bloeiseltjies in 'n gemeenskaplike omhulsel. Die familie sluit in die pragtige soorte Gazania, Arctotis, Gerbera, Venidium, Ursinia, ens., en ook plante met onopvallende blommetjies soos die renosterbos (Elytropappus), en die slangbos (Stoebe). Ander bekende plante is die talryke sewejaartjies (Helichrysum, Phoenocoma, ens.) en die selfs talryker kruiskruid (Senecio). 'n Groot aantal bekende ingevoerde soorte onkruid behoort hieraan, b.v. verskillende soorte distels (Sonchus, Cnicus, Silybum, Centaurea), die boetebossie (Xanthium), die kakiebos (Tagetes), ens.

No. 46
SILVER PEA.
PRIESTLEYA VILLOSA.

Types of South African Vegetation

In the following chapter will be described in outline the principal types of vegetation which are found in the various parts of the Union. The idea of "vegetation" is distinct from that of "plants" in the same way that the idea of a human society is distinct from that of individuals, races or families. Similar types of vegetation may occur in widely separated parts of the globe although the plants of which they are composed are unlike. For instance, tropical rain-forest is the principal type of plant society in the Malay Archipelago, the Cameroons and the Amazon basin, but the trees, palms, lianas, ferns, etc., in the three areas are of totally different species: the grasslands of the Transvaal are composed of different grasses from those of the comparable grasslands of the Argentine: desert vegetation occurs in the Sahara, the Namib, Arizona and Central Australia, the plants being different in each case but the plant societies having their principal characteristics common to all.

No. 47
BLOUKEUR.
PSORALEA APHYLLA.

The distribution of "plant societies" or of "types of vegetation" depends mainly on factors of climate and soil.

Tipes van Suid-Afrikaanse Plantegroei

Die volgende hoofstuk bestaan uit 'n algemene beskrywing van die vernaamste tipes van plantegroei wat in verskillende dele van die Unie aangetref word. Die opvatting van „plantegroei" is apart van dié van „plante", soos die opvatting van 'n menslike gemeenskap apart is van dié van individue, rasse of families. Soortgelyke tipes van plantegroei kan in wyd uitmekaar verspreide dele van die aardbol aangetref word, alhoewel die plante waaruit hulle bestaan, verskillend is. By voorbeeld, tropiese reënbos is die vernaamste plantgenootskap in die Maleise Argipel, die Kamaroen en die Amazonbassin, maar die bome, palms, liane, varings, ens., in die drie gebiede aanwesig, behoort tot totaal verskillende species: die grasveld van die Transvaal bestaan uit grasse wat verskil van dié van die vergelykbare grasstreke van Argentinië: woestynplantegroei is aanwesig in die Sahara, die Namib, Arizona, en Sentraal-Australië, waar die plante in elke geval verskillend is, maar waar die vernaamste kenmerke van plantgenootskappe ooreenstemming openbaar.

No. 48
GANSIES.
CANCER BUSH.
SUTHERLANDIA FRUTESCENS.

Die verspreiding van „plantgenoot-

No. 49
SCARLET GERANIUM.
ROOI MALVA.
PELARGONIUM INQUINANS.

In South Africa, as elsewhere, climate determines the general character of the vegetation—forest, scrub, savannah, grassland, karoo, etc.—over large areas. The total annual rainfall varies greatly in the different parts of the Union; and the actual amount that may fall in a year ranges from zero to well over a hundred inches. The distribution of the rainfall throughout the year also varies. Localities with an all-the-year-round rainfall are very limited, and the greater part of the country has a pronounced dry season of several months during which rains are exceptional. This dry season is the summer in the south-west Cape Province and the winter in the Free State, the Transvaal and Natal. These differences have a profound effect on the vegetation.

Within an area of uniform climate variations of soil produce great local differences in the vegetation. Soils may be deep, shallow or non-existent, fine or coarse, acid or alkaline, rich or poor in soluble minerals, and so on.

Thus the physical conditions of climate and soil which affect human life and agriculture are reflected by the native vegetation, and if we had knowledge enough to read the indications which it gives we should be saved from many mistakes. Moreover we should be able to recognise the influence of artificial factors such as burning, overstocking, etc., and could endeavour to regulate our policy accordingly. Hence we may realise that the study of botany, and in particular the branch known as "ecology" or "plant sociology," is of great importance for the future well-being of this country.

KALKOENTJIE KALKOENTJIE

GLADIOLUS ALATUS

Gladiolus alatus, the kalkoentjie, is a plant of the hills and plains of the Cape Peninsula and adjoining districts. It flowers in August and September, and the form and colouring of its flowers are curious and unmistakeable. It was formerly abundant, but like many other wild flowers it has been greatly reduced in numbers by cultivation of the land.

Gladiolus alatus, die kalkoentjie, is 'n plant wat op die heuwels en vlaktes van die Kaapprovinsie en aangrensende distrikte aangetref word. Dit blom in Augustus en September, en die fatsoen en kleur van die blomme is eienaardig en onmiskenbaar. Voorheen was dit oorvloedig, maar soos in die geval van baie ander soorte veldblomme, is hierdie plantesoort grootliks uitgedun weens bewerking van die grond.

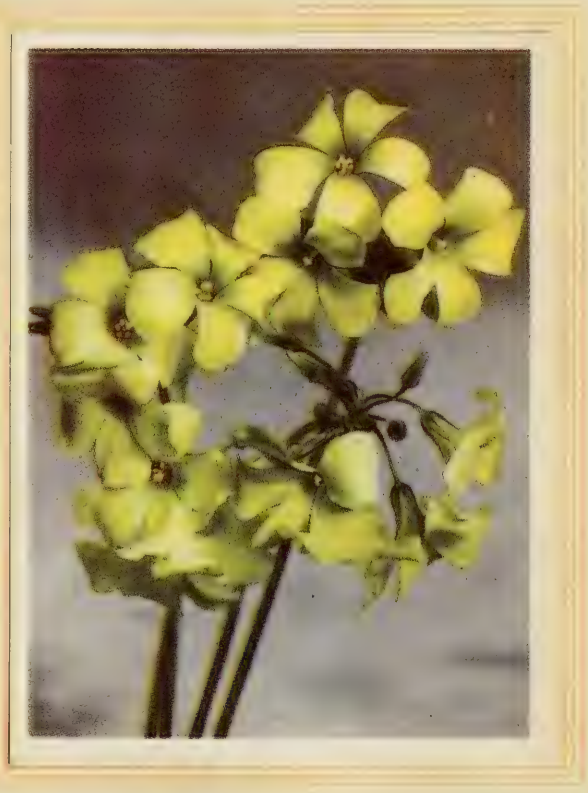
skappe" of van „tipes van plantegroei" hang hoofsaaklik van die faktore klimaat en grond af.

In Suid-Afrika, soos elders, bepaal die klimaat die algemene aard van die plantegroei—bos, struikgewas, savanna, grasveld, Karoo, ens.—oor groot gebiede. Die totale jaarlikse reënval verskil grootliks in die verskillende dele van die Unie: en die werklike hoeveelheid wat gedurende die jaar kan val, kan van nul tot goed oor 'n honderd duim afwissel. Die distribusie van die reënval dwarsdeur die jaar wissel ook af. Gebiede met 'n reënval dwarsdeur die jaar is baie beperk en die grootste deel van die land kry 'n gevoelig droë seisoen van 'n aantal maande, wanneer 'n bui reën 'n uitsondering is. Die droë seisoen is die somer in die suidwestelike Kaapprovinsie en die winter in die Vrystaat, Transvaal en Natal. Hierdie verskille het 'n gevoelige uitwerking op die plantegroei.

In 'n gebied met 'n egalige klimaat, veroorsaak 'n verskil van die grondsamestelling opvallende verskille in die plantegroei. Grond kan diep, vlak of afwesig, fyn of grof, suur of brak, ryk of arm aan oplosbare chemiese bestanddele, ens., wees.

Dus word die fisiese eienskappe van klimaat en grond wat die menslike voortbestaan en landbou beïnvloed, deur die inheemse plantegroei weerspieël; en had ons genoeg kennis om die aanduidings te kan begryp wat dit openbaar, sou ons baie foute kon vermy het. Wat meer is, ons behoort die uitwerking van kunsmatige faktore soos veldbrand, oorbeweiding, ens., te kan besef en ons beleid daarvolgens probeer bepaal. Ons sal dus begryp dat 'n studie van plantkunde en veral die vertakking bekend as „ekologie" of „plantsosiologie" van die grootste belang vir die toekomstige welvaart van Suid-Afrika is.

No. 50
GEEL SURING.
YELLOW SORREL.
OXALIS PES CAPRAE.



Forests: the Society of Trees and their Undergrowth

TREES occur over a large part of the Union, but forest proper is very limited in extent. The mere presence of trees does not constitute a forest, either in the popular or the scientific sense of the word. Such types of country as bush-veld or savannah are always regarded as distinct from true forest. In country which we recognise as forest the trees are close enough to one another for their crowns to form a more or less continuous canopy, the result of which is to create very different conditions beneath that canopy to what would exist if it were removed. The amount of light penetrating through the canopy to the forest floor is very much reduced: the movement of air inside the forest is slower: evaporation from the soil is reduced: the day temperature is lower: and all these influences result in a moister atmosphere and soil and a less intense light, and consequently a quite different type of plants forms the forest undergrowth from those which exist outside the forest. In the savannah and bush-veld types of country the trees are well spaced out, they often cast little shade and their undergrowth is therefore very

No. 51
PURPLE SORREL.
ROOI SURING.
OXALIS PURPUREA.

Bosse: Die Genootskap van Bome en Hul Struikgewasse

BOME word oor 'n groot deel van die Unie aangetref, maar eintlike boswêreld is beperk. Die blote aanwesigheid van bome dui nie 'n bos aan nie, hetsy in die alledaagse of die wetenskaplike sin van die woord. Die streek bekend as bos- of grasveld word altyd as afsonderlik van egte boswêreld beskou. In sulke gebied wat ons as boswêreld boskou, is die bome so na aanmekaar dat hul toppe min of meer 'n ononderbroke gewelf vorm, die gevolg waarvan is om baie verskillende toestande onder daardie gewelf te skep as wat die geval sou wees indien dit verwyder sou geword het. Die hoeveelheid lig wat deur die gewelf van die bos tot op die grond deurdring, word grootliks verminder; die beweging van lug in die bos is stadiger; verdamping uit die grond is verminder; en al hierdie invloede het as gevolg 'n vogtiger atmosfeer en grond en minder gekonsentreerde lig, en gevolglik verteenwoordig die struikgewasse in die bos 'n heeltemal verskillende soort plantegroei as daarbuite. In die gras- en bosveldstreek staan die bome mooi van mekaar af, hulle gooi dikwels nie baie skaduwee nie en hul struikgewas is derhalwe baie min anders as

No. 52
KLIPSISSIE.
ADENANDRA FRAGRANS.

little different from what it would be if the trees were removed: whereas in true forest the removal of the trees has a marked effect upon the undergrowth.

Forest occurs mainly along the mountain ranges parallel with the south and east coasts of the Union and on their seaward sides and also on the Drakensberg escarpment in Natal and the Transvaal. Most of the forests are limited in extent and often confined to sheltered kloofs. The Knysna forest occurs over hills, plains and mountain slopes in a region of rainfall evenly distributed throughout the year.

No. 53
CHINESE LANTERNS.
KLAPPERBOS.
NYMANIA CAPENSIS.

Most of our forest trees are evergreen and have undivided leathery leaves often with a smooth surface. They are almost always found in a mixture of several species. The Yellowwoods (Podocarpus) are often the tallest trees, sometimes reaching 150 feet, their crowns standing high above the general canopy and bearing grey streamers of lichen. Other well-known trees are the Black Ironwood (Olea), the Stinkwood (Ocotea), the Assegaai (Curtisia), the Rooi Els (Cunonia), the Hard Pear (Olinia), the Red Pear (Scolopia), the White Pear (Apodytes) and many others. Woody climbers or Monkey Ropes (Secamone, Vitis) festoon the trees. Ferns are abundant in the undergrowth including Tree Ferns (Hemitelia in the Cape, Cyathea in Natal and the Transvaal) and various characteristic shrubs, bulbous plants and herbs. In the summer rainfall districts epiphytic orchids are found on the tree trunks and branches, together with some ferns and abundant mosses, liverworts and lichens.

Our forests usually have a well-defined edge: this is mainly due to bush fires in the adjoining vegetation which destroy the forest margin and, if frequent, eat into and finally exterminate the whole forest.

Forest is the most highly developed form of plant-society, and is usually regarded as a "climax." That is, starting with a piece of bare soil in a suitable climate, the vegetation appearing on it will ordinarily go through a series of stages; first a weedy growth of herbaceous plants, then shrubs which will

wat die geval sou gewees het as die bome nie daar sou gewees het nie ; terwyl in die geval van egte boswêreld, die verwydering van die bome 'n aansienlike uitwerking op die struikgewas het.

Bosse word hoofsaaklik op die bergreekse aangetref wat parallel loop met die suid- en ooskus van die Unie en op hul seekant en ook op die Drakensbergse steiltes in Natal en die Transvaal. Die meeste bosse is beperk in omvang en word dikwels veral in klowe aangetref. Die Knysna-bos word op heuwels, vlaktes en berghange in 'n streek waar die reënval egalig dwarsdeur die jaar plaasvind, aangetref.

Die meeste van ons bosbome is ewiggroen en besit onverdeelde, leeragtige blare, dikwels met 'n gladde oppervlakte. Hulle word bykans altyd in verskeie soorte deurmekaar aangetref. Die Geelhout (Podocarpus) is dikwels die hoogste bome, wat somtyds 150 voet haal, en waarvan die toppe hoog bokant die gewone gewelf uitsteek en waaraan grys stroke korsmos hang. Ander bekende bome is die Swart Ysterhout (Olea), die Stinkhout (Ocotea), die Assegaai (Curtisia), die Rooi Els (Cunonia), die Harde Peer (Olinia), die Rooi Peer (Scolopia), die Wit Peer (Apodytes) en baie ander. Houterige klimop of Bobbejaantou (Secamone, Vitis) festoneer die bome. Varings is oorvloedig in die struikgewas, insluitende boomvarings (Hemitelia in die Kaap, Cyathea in Natal en die Transvaal) en verskeie kenmerkende struike, knollerige plante en kruiesoorte. In die somerreën-valdistrikte word epifitiese orgideë op die boomstamme en -takke tesame met 'n aantal varingsoorte en mos, lewermos en korsmos in oorvloed aangetref.

No. 54
BLOUKAPPIE.
POLYGALA VIRGATA.

Ons bosse besit gewoonlik 'n duidelik gemerkte rand : dit is hoofsaaklik aan bosbrande in die aangrensende plantegroei te wyte wat die bosrand vernietig ; en as dit dikwels voorkom, knaag hulle iedere keer verder en roei eindelik die hele bos uit.

'n Bos is die hoogs ontwikkelde vorm van plantgenootskap en word gewoonlik as 'n „klimaks" beskou. Dit wil sê, as daar in die begin 'n stuk kaal grond in 'n geskikte klimaat is, sal die plantegroei wat

No. 55
WILD BOTTLEBRUSH.
BAAKHOUT.
GREYIA SUTHERLANDII.

smother the herbaceous growth, and finally trees which will kill out the shrubs : so that forest is the " climax " of this " succession." The whole process may take centuries or may be interrupted and never reach completion : the chief obstacle being human interference in one form or another.

Fires and indiscriminate felling have largely modified or ruined much of our forest : big trees are now scarce except where inaccessible, and many former forest areas are now covered by a tangle of bead-fern, brambles and other weedy growth and will probably never revert to their original tree-clad condition.

One of the aims of Forestry is to preserve and improve existing indigenous forest, which is the most valuable type of plant-covering that the soil can bear—both from the point of view of choice timber production and because of the importance of native forests in the conservation of water and the improvement of the climate.

In a country with so limited an amount of indigenous forest, moreover, special efforts are desirable to encourage the spread and development of this beautiful plant-society for its aesthetic value in the landscape.

sy verskyning daarop maak gewoonlik deur 'n reeks stadiums gaan; eers 'n versameling onkruidagtige plante, dan struikgewas wat hierdie gewasse versmoor, en eindelik bome wat die struikgewas vernietig: sodat 'n bos die „klimaks" van hierdie „proses" is. Die hele proses kan eeue duur of kan gestuit word om nooit voltooiing te bereik nie: die vernaamste hinderpaal waarvan kan wees die tussenkoms van die mens in die een of ander vorm.

Bosbrande en die voor-die-voet weg uitkap van bome het 'n groot deel van ons bosse verander of geruïneer: groot bome is nou skaars, behalwe waar hulle nie bereik kan word nie, en baie streke wat voorheen bosgebied was, word nou deur 'n netwerk van kraalvaring, braambos en ander struike bedek en sal waarskynlik nooit weer hul oorspronklike boom-bedekte aanskyn verkry nie.

Een van die doeleindes van Bosbou is om die bestaande inheemse bosse te bewaar en te verbeter, aangesien dit die waardevolste soort plantegroei is wat die grond kan dra—sowel uit die oogpunt van 'n bron van goeie timmerhout as weens die belangrikheid van inheemse bosse vir die bewaring van water en die verbetering van die klimaat.

Boonop is spesiale pogings wenslik in 'n land met so 'n beperkte bosstreek om die verspreiding en ontwikkeling van hierdie skone plantegenootskap aan te moedig omdat dit die aantreklikheid van die landskap verhoog.

No. 56
HIBISCUS DIVERSIFOLIUS.

Scrub: the Society of Bushes and their Companions

LARGE areas of the Union are covered by some form of scrub vegetation, by which is meant a fairly close plant society dominated by shrubs. These may be of very various stature but are mostly evergreen and have small hard leaves. Practically all the Cape coastal mountains have this type of vegetation on their open slopes, extending from base to summit, and the lower hills and flats also.

The number of different species of plants composing the Cape scrub is enormous. Familiar are the Protea Family, the Heaths, the Buchus, such small-flowered Compositae as the Slangbos, Rhenosterbos, Kapokbos and Blombos, Everlastings, Taaibos and Pelargoniums: and mixed with these shrubs we find a vast number of bulbous plants (especially of the Ixia Family), Reeds, Sedges and numerous herbaceous plants. Aromatic plants abound, but on the other hand succulents and grasses are rare.

Annual plants are not numerous except where the soil is a loose sand and the plant society is an "open" one, that is, where there are

No. 57
NATAL REDWOOD
ROOIHOUT.
OCHNA NATALITIA.

Struikgewasse: Die Genootskap van Bossies en Hul Maters

Groot dele van die Unie word deur een of ander vorm van struikgewas bedek, wat beteken 'n taamlik digte plantegemeenskap waarvan struikgewasse die meerderheid uitmaak. Hulle kan van verskillende groottes wees, maar hulle is gewoonlik ewiggroen en besit klein harde blaartjies. Die oop hellings van feitlik al die Kaapse kusberge word deur hierdie soort plante begroei, wat strek van die voet tot aan die top, en wat ook op die laer heuwels en vlaktes aangetref word.

No. 58
WILD BEGONIA.
BEGONIA SUTHERLANDII.

Die getal verskillende plantesoorte waaruit die Kaapse struikgewasse bestaan is enorm. Die bekendste is die Proteafamilie, die Heide, die Boegoe, sulke kleinblommige Compositae soos die Slangbos, Renosterbos, Kapokbos en Blombos, Sewejaartjies, Taaibos en Pelargoniums: en, gemeng met hierdie struikgewasse, is daar 'n reuse-reeks bolgewasse (veral van die Ixia-familie), Riet, Rietgras en talryke klein kruidagtige plantesoorte. Geurige plantesoorte word in oorvloed aangetref, maar aan die ander kant is vetplante en grasse skaars.

Jaarplante is nie talryk nie, behalwe waar die grond los sand en die

spaces of bare soil between the perennial plants. This type of country, sometimes known as sandveld, occupies extensive areas in the Western Cape coastal belt. Its summer aspect is unprepossessing, but during the winter and early spring it presents a spectacle of great beauty through the flowering of the perennial and bulbous plants, e.g. species of Gazania, Arctotis, Oxalis, Grielum, Mesembryanthemum, Ixia, Lachenalia, Babiana, and also of a great number of brilliantly coloured annuals, among which are species of Ursinia, Dimorphotheca, Nemesia, Diascia, Charieis, Dorotheanthus, Heliophila, etc. Many of these sandveld plants are illustrated in this volume and are among South Africa's outstanding contributions to the gardens of the world.

No. 59
KANNABAST.
DIAS COTINIFOLIA.

Many of the shrubs composing the scrub society possess small narrow leaves of a firm, dry texture : their small size is compensated by their presence in large numbers on the plant. These leaves are often called " ericoid " because they occur typically in the heaths (Erica). So characteristic are these leaves of the Cape mountain and hillside scrub that it is sometimes known as " fynbos." They are found not only among the heaths but also in many species of the Daisy, Brunia, Verbena, Buchu, Daphne and Cat-thorn families, etc. These ericoid leaves are often grooved and stomata (" breathing pores ") are only present in the groove. No doubt this leaf-form has some connection with drought-resistance.

Other examples of drought-resistance among scrub plants are the aromatic oils so many of them contain (e.g. the Buchus), which have been shown to reduce the rate of loss of water ; a dense clothing of hairs on leaves and stems, e.g. in the Everlastings ; and the frequent grey colour due to a thin coating of wax. Usually the scrub is easy to walk through, but in some areas prickly plants, e.g. the Wag-'n-bietjie (Asparagus), and Steekbos (Cliffortia) are present and make progress more difficult.

These scrub societies are very inflammable, and are unfortunately being impoverished in every way by frequent fires : many of these fires are caused by accident or carelessness, but a large number are deliberately started with

plantegenootskap 'n „oop" tipe is, d.w.s. waar daar lappe kaal grond tussen die meerjarige plante is. Hierdie soort landstreek wat dikwels bekend is as sandveld, beslaan 'n omvangryke oppervlakte in die kusstreek van Wes-Kaapland. In die somer is dit onopvallend, maar gedurende die winter en die vroeë lente bied dit 'n skouspel van die grootste prag in die vorm van die bloeisels van die meerjarige en bolagtige plante, soos b.v. soorte Gazania, Arctotis, Oxalis, Grielum, Mesembryanthemum, Ixia, Lachenalia, Babiana, asook 'n groot aantal helder gekleurde jaarplante, waaronder Ursinia, Dimorphoteca, Nemesia, Diascia, Charieis, Dorotheanthus, Heliophila, ens. Baie van hierdie sandveldplante word in hierdie bundel gewys en word onder Suid-Afrika se beste bydraes tot die tuine van die wêreld gereken.

Baie van die struike wat die struikgewasgenootskap uitmaak, besit klein smal blaartjies van 'n vaste, droë geaardheid : hul kleinheid word vergoed deur die aanwesigheid van hul groot getal op die plant. Hierdie blaartjies word dikwels „heiagtig" genoem, omdat hulle tipies is van die heide (Erica). Hierdie blaartjies is kenmerkend van die Kaapse berg- en heuwelstruikgewasse en dit staan dus somtyds bekend as „fynbos". Hulle word nie alleen onder die heide aangetref nie, maar ook onder baie soorte Madeliefie, Brunia, Verbena, Boegoe, Daphne en Katdoringfamilies, ens. Hierdie heiagtige blare besit dikwels groefies, en huidmondjies is slegs in die groef aanwesig. Hierdie blaarvorm staan ongetwyfeld in verband met weerstand teen droogte.

No. 60
MIELIE-HEIDE.
MEALIE HEATH.
ERICA ABIETINA.

Ander voorbeelde van weerstand teen droogte onder struikgewasse is die geurige oliesoorte wat so baie van hulle bevat (b.v. Boegoe) wat soos bewys is, die verdamping van water verminder ; verder 'n digte lagie hare op die blaartjies en stammetjies, b.v. in die geval van die Sewejaartjies ; en dikwels die grys kleur wat toe te skryf is aan 'n dun lagie was. 'n Mens kan gewoonlik maklik deur struikgewas loop, maar in sommige gebiede is daar steekplante, b.v. die Wag-'n-bietjie (Asparagus), en Steekbos (Cliffortia) wat hinderlik is.

Hierdie struikgewasgenootskappe is

No. 61
ERICA AXILLIFLORA.

the mistaken idea of improving the grazing, which is normally very poor and really unsuitable for stock in this type of country.

The scrub has also been largely destroyed by ploughing, especially in the south-west Cape, and a vast acreage once botanically very rich has been replaced by the monotony of wheatlands, fallow and rhenoster-veld.

In the Cape Peninsula what is essentially a scrub society may contain scattered trees—for instance the Silver Tree (Leucadendron). At Kirstenbosch also may be seen how, under conditions of greater protection from fire, other trees may also obtain a foothold in the scrub and so prepare the way for true forest: such pioneer trees are the Keurboom (Virgilia), the Keurtje (Podalyria), the Pendooring and Sybas (Gymnosporia), the Wild Olives (Olea), the Wild Peach (Kiggelaria) and several others. If undisturbed by man and by fires it is probable that much of the mountain scrub in the Cape Province would gradually be invaded by trees and thus be converted into forest. Unfortunately the tendency is all the other way, and human agencies are converting much of our mountains into what is almost semi-desert.

uiters ontvlambaar en word ongelukkig op elke manier deur brand wat dikwels voorkom, uitgedun : baie van hierdie brande word per ongeluk of deur agtelosigheid veroorsaak, maar 'n groot aantal daarvan word opsetlik veroorsaak onder die wanbegrip dat dit die weiveld sal verbeter, wat gewoonlik baie armoedig en uit die aard van die saak ongeskik is vir vee.

Die struikgewas is ook grotendeels deur die omploeg van grond, veral in Suidwes-Kaapland vernietig, en 'n uitgestrekte gebied wat voorheen baie ryk aan plantegroei was, word nou deur eentonige saai- en braakland en renosterveld vervang.

In die Kaapse Skiereiland kan plantegroei wat bepaald 'n struikgewasgenootskap is, ook bome insluit—by voorbeeld, die Witteboom (Leucadendron). Op Kirstenbosch kan ook gesien word hoedat, danksy toestande wat groter beskerming teen vuur verleen, ander bome ook 'n vatplek in die struikgewas kan kry en aldus die weg vir 'n regte woud baan : sulke pionierbome is die Keurboom (Virgilia), die Keurtjie (Podalyria), die Pendoring en Sybas (Gymnosporia), die Wilde Olywe (Olea), die Wilde Perske (Kiggelaria) en verskeie ander. Indien die mens en vuur hulle ongehinderd sou gelaat het, is dit waarskynlik dat baie van die bergstruikgewas in die Kaapprovinsie geleidelik deur bome verplaas en dus in boswêreld verander sou geword het. Ongelukkig is die neiging net die teenoorgestelde en is die mens besig om baie van ons berge in wat feitlik as half-woestyn beskou kan word, te verander.

No. 62
RIVERSDAL-HEIDE.
LANTERN HEATH.
ERICA BLENNA.

Karoo, Semi-Desert and Desert: the Societies of Thirstland

It is estimated that about one-third of the surface of the Union is occupied by vegetation of these types. The principal factor in producing them is low and erratic rainfall, from an average of about ten inches per annum down to almost nil.

Typical Karoo occurs over large areas of hills and plains in the Cape Province. Between the River Sonder End Mountains and the Langeberg is the Robertson Karoo: between the Langeberg and the Swartberg is the Little Karoo: between the Swartberg and the Komsberg-Nieuweveld escarpment and extending far eastwards is the Great Karoo: between the Cedarberg-Swartruggens Mountains and the Roggeveld escarpment is the Tanqua and Doorn Karoo: and Karoo vegetation also occurs over considerable areas in the Van Rhynsdorp and Namaqualand divisions.

No. 63
ERICA FOLIACEA.

Karoo vegetation is typically composed of scattered small bushes with a good deal of bare soil or rock in between. The bushes range from a few inches to two or three feet in height, and there are sometimes

RED DISA

DISA UNIFLORA

ROOI DISA

Disa uniflora, the Red Disa, the " Pride of Table Mountain," is one of the most distinctive orchids in the world, both in form and colouring. It grows in the peaty banks of mountain streams and in mossy places on krantzes where water trickles, and flowers in the summer months (January to March). It occurs in the mountains of the western coastal belt from the Cedarbergen to George. It is difficult and rare in cultivation, but has been successfully grown in the open at Kirstenbosch.

Disa uniflora, die rooi disa, die „Trots van Tafelberg", is een van die mees tiperende orgideë in die wêreld, beide wat betref die vorm en kleur daarvan. Dit groei op die veenagtige oewers van bergspruitjies en in mosagtige plekke op kranse waar water deursyfer, en dit blom gedurende die somermaande (Januarie tot Maart). Dit word op die berge van die westelike kusstreek van die Cedarberge tot by George aangetref. Dit is moeilik om dit in 'n tuin te kweek en dit word selde daar aangetref, dog dit is met sukses in die tuin op Kirstenbosch gekweek.

Karoo, Half-Woestyn en Woestyn: Die Genootskappe van die Dorsland

DAAR is bereken dat ongeveer een-derde van die oppervlakte van die Unie deur hierdie soort plantegroei bedek word. Die vernaamste faktor wat daarvoor verantwoordelik is, is 'n karige en ongereëlde reënval, wat van gemiddeld tien duim tot byna niks per jaar bedra.

Tipiese Karoo beslaan groot gebiede op heuwels en vlaktes in die Kaapprovinsie. Tussen die berge van Riviersonderend en die Langeberg is die Robertson-karoo: tussen die Langeberg en die Swartberg is die Klein Karoo: tussen die Swartberg en die Komsberg-Nuweveldreeks en wat in 'n oostelike rigting uitstrek, is die Groot Karoo: tussen die Cedarberg-Swartruggensberge en die Roggeveldreeks is die Tanqua en Doring-karoo: en Karoo-plantegroei is ook op uitgestrekte gebiede in die Van Rhynsdorpse en Namakwalandse afdelings aanwesig.

No. 64
VEERHEIDE.
PRINCE OF WALES HEATH.
ERICA PERSPICUA.

Die tipiese Karoo-plantegroei bestaan uit verspreide klein bossies met heelwat kaal grond of rots tussenin. Die hoogte van die bossies loop van 'n paar duim tot twee of drie voet, en daar is somtyds alleenstaande groter struikgewasse (Ghwarrie, Taaibos, Driedoring, Lycium,

isolated larger shrubs (Guarri, Taaibos, Driedoorn, Lycium, etc). Although small, owing to the aridity of the climate and to more or less severe grazing by sheep and goats, these bushes may be of great age, often having twisted, split and almost barkless stems bearing tufts of a few small leaves. Compositae abound, for instance the various kinds of Karoobos (Pentzia), Bitterbos (Chrysocoma), Kapokbos (Eriocephalus), Pteronia, Relhania, Tripteris, etc. The majority of these plants are aromatic, containing oils, gums and resins, which play their part in drought resistance.

No. 65
ELIM HEATH.
BELLETJIEHEIDE.
ERICA REGIA.

Most characteristic of the Karoo, however, are the innumerable varieties of succulent plants which make it a veritable wonderland for the botanist. The Vijgie Family (Mesembryanthemum and allied genera) is the most abundant. Some species such as the Doringvygie (*M. spinosum*) are locally dominant, and there are many others, both shrubby and trailing, which are so plentiful as to colour the landscape with their brilliant flowers in good seasons. Moreover, the Karoo is the home of the so-called stemless Vygies or Stone Plants, of strange compact forms which are among the chief marvels of the plant world, and are well known to the botanist and to the collector under the names of Lithops, Conophytum, Gibbaeum, Rimaria, Pleiospilos, Argyroderma, etc.

Succulence is also found in Karoo plants belonging to the most varied affinities. Thus the Lily Family is represented by the Aloes, Gasterias and Haworthias ; the Euphorbia Family by a large number of very diverse forms of Euphorbia known as Melkbos, Vingerpol, Noorsdoring, etc. ; the Stapelia Family by a host of stem-succulents belonging to the genera Stapelia, Caralluma, Huernia, Piaranthus, Hoodia, Trichocaulon, etc. ; the Crassula Family by the grotesque thick-stemmed Botterboom and other Cotyledons, as well as by innumerable species of Crassula, large and small ; the Geranium Family by the well-known Bushman's Candle (Sarcocaulon) ; the Compositae by members of the genera Kleinia and Senecio : and many others could be mentioned.

ens.). Alhoewel hierdie bossies klein is weens die droogheid van die klimaat, en as gevolg van die somtyds uitputtende weiding deur skape en bokke, kan hulle baie oud wees, met dikwels gedraaide, gesplete en feitlik baslose stamme met toppe met kwassies blaartjies daaraan. Compositae is in oorvloed aanwesig, soos by voorbeeld die verskillende soorte Karoobos (Pentzia), Bitterbos (Chrysocoma), Kapokbos (Eriocephalus), Pteronia, Relhania, Tripteris, ens. Die meerderheid van hierdie plante is geurig, aangesien hulle olie, gom en harpuis bevat wat 'n rol speel in die weerstand teen droogte.

Wat egter uiters kenmerkend van die Karoo is, is die enorme verskeidenheid vetplante wat 'n ware towerland vir die plantkundige verteenwoordig. Die Vygiefamilie (Mesembryanthemum en soortgelyke families) is die oorvloedigste aanwesig. Sommige soorte soos die Doringvy (*M. spinosum*) is plaaslik opvallend en daar is baie ander soorte, sowel wat stoel as wat rank, wat so oorvloedig aanwesig is dat hulle die landskap in goeie seisoene met hul kleurryke bloeisels skilder. Boonop is die Karoo die tuiste van die sogenoemde stamlose Vygies of Klipplante, met 'n eienaardige vaste struktuur wat tot die vernaamste wonders van die plantwêreld gereken kan word, en wat bekend is aan die plantkundige en die versamelaar onder die name Lithops, Conophytum, Gibbaeum, Rimaria, Pleiospilos, Argyroderma, ens.

No. 66
ERICA SUBDIVARICATA.

Sappigheid word ook aangetref in Karoo-plante wat tot die mees uiteenlopende soorte behoort. So word die Leliefamilie verteenwoordig deur die Alwynsoorte, Gasterias en Haworthias; die Euphorbia-familie deur 'n groot aantal uiters uiteenlopende vorms van Euphorbia bekend as Melkbos, Vingerpol, Noorsdoring, ens.; die Stapelia-familie word verteenwoordig deur 'n reuse-reeks stamsukkulente wat behoort tot die geslagte Stapelia, Caralluma, Huernia, Piaranthus, Hoodia, Trichocaulon, ens.; die Crassulafamilie word verteenwoordig deur die groteske, dikstammige Botterboom en ander Cotyledons, sowel as deur die talryke soorte Crassula, groot en klein; die Malvafamilie deur die welbekende Boesmanskers (Sarcocaulon); die

No. 67
BOSLUISBLOM.
ERICA VIRIDIPURPUREA.

In addition a large number of "bulbous" plants are present, many having water-storing tubers and bulb-scales, so that they can be regarded as underground succulents. Many of these only produce leaves and flowers in seasons of more than average rainfall. The same applies to the annuals, of great variety and often with small but brightly coloured flowers, which may lie dormant in the form of seeds for years, but in a good season germinate and cover the bare soil between the bushes with a carpet of fugitive colour.

In the more elevated part of the Cape Province north of the Nieuweveld and east of the Roggeveld escarpments the vegetation consists of scattered bushes just as in the Karoo, but succulent plants are scarce and there is much more grass, especially in the districts with frequent summer thunderstorms. This region is sometimes called the Upper Karoo.

Finally, in regions of thin soil or of drifting sand under high temperatures and very low rainfall we find true desert, as in the neighbourhood of the lower Orange River, from Upington to the sea. Desert is also developed on the grand scale in South-West Africa on the rocks, gravels and sand-dunes of the Namib. Vegetation is well-nigh absent, only a few widely separated deep-rooting plants occurring on the flats and an occasional succulent in rock-crevices on the koppies.

Compositae deur lede van die geslagte Kleinia en Senecio; en daar is baie ander wat genoem kan word.

Boonop is daar 'n groot aantal „bolagtige" plante aanwesig, baie waarvan waterbewarende bolle en bolskubbe besit, sodat hulle as ondergrondse vetplante beskou kan word. Baie daarvan blom slegs in seisoene met meer as die gemiddelde reënval. Dieselfde is van toepassing op die jaarplante, wat 'n groot verskeidenheid uitmaak en wat dikwels klein, dog helder gekleurde blommetjies besit, wat jare lank in die vorm van saad rustend kan lê, maar wat gedurende 'n goeie seisoen ontkiem en die kaal grond tussen die bossies met 'n veelkleurige tapyt oordek.

In die hoër geleë gebied van die Kaapprovinsie, noord van die Nuweveld en oos van die Roggeveldbergreeks, bestaan die plantegroei uit verspreide bossies, net soos in die Karoo, maar sappige plante is skaars en daar is baie meer gras, veral in die distrikte wat dikwels onderhewig is aan donderstorms gedurende die somer. Hierdie gebied word somtyds die Bo-Karoo genoem.

Ten slotte tref ons egte woestyn aan, in streke met 'n dun grondlaag of met dryfsand wat aan 'n hoë temperatuur blootgestel is, en met 'n baie lae reënval, soos in die omgewing van die benedeloop van Oranjerivier, vanaf Upington tot by die see. Woestyn is ook sterk in Suidwes-Afrika op die rotse, gruis en sandduine van die Namib ontwikkel. Plantegroei is weldra afwesig, met slegs 'n paar wyd uitmekaar verspreide plante met lang wortels wat op die vlaktes en af en toe 'n vetplant wat in rotsskeure op die koppies voorkom.

No. 68
PLUMBAGO.
PLUMBAGO CAPENSIS.

Grassland: the Illimitable Veld

THE Grass Family is a very large one and is extensively represented in the Union. The majority of grasses are plants of summer rainfall conditions: some are annuals, but most of them are perennials of different kinds, some forming tufts or tussocks, others trailing over the soil or beneath the surface and forming a continuous ground-cover or turf. Districts with a predominant winter rainfall have a considerable number of species of grasses, but they rarely form a feature of the landscape except where there is soil moisture in summer or where an occasional summer rain can be relied upon. In the summer rainfall districts, on the other hand, grasses are exceedingly plentiful, both in species and in individuals; and over great areas of the Transvaal, the Orange Free State, the uplands of Natal, Basutoland and some high ground in the Cape Province the prevailing type of vegetation is that known as grassveld, in which grasses are definitely the dominant plants.

No. 69
PINK STATICE.
STRANDROOS.
STATICE ROSEA.

Grassveld is mainly an upland type of vegetation, occurring on the rolling hills and plains of the central plateau

Grasveld : Die Eindelose Vlakte

Die grasfamilie is baie omvangryk en ruimskoots in die Unie verteenwoordig. Die meerderheid van grassoorte is plante wat in somerreënvalstreke aanwesig is : sommige daarvan is jaarplante, maar die meeste van hulle is meerjarige plante van uiteenlopende aard, sommige waarvan kwassies of polle vorm, ander waarvan bo die grond of onder die grond rank en 'n ononderbroke grondbedekking of tapyt vorm. Distrikte met 'n oorwegende winterreënval besit 'n aansienlike aantal grassoorte, maar hulle vorm selde 'n kenmerkende deel van die landskap, behalwe waar daar grondvogtigheid in die somer aanwesig is of waar 'n bui reën in die somer te wagte kan wees. In die somerreënvaldistrikte word grassoorte daarenteen in oorvloed aangetref, wat betref sowel species as afsonderlike lede; en op uitgestrekte gebiede in die Transvaal, die Oranje-Vrystaat, die hoogland van Natal, Basoetoland en op hoogliggende gebied in die Kaapprovinsie is die oorwegende soort plantegroei dié wat bekend staan as grasveld, waar grassoorte definitief die botoon voer.

No. 70
WILDE JASMYN.
WILD JASMINE.
JASMINUM TORTUOSUM.

Grasveld kan hoofsaaklik

at altitudes above 4,000 feet. For this reason it is often called highveld. This region has practically all its rain in the form of heavy showers in the summer months, and under these conditions the perennial grasses grow rapidly and the veld is green, variegated with the red or brown bare soil between the grass-tufts, as far as the eye can reach. In the winter, however, rain is rare, and this dryness combined with the occurrence of frosts almost every night prevents the growth of the grasses. The leaves and the upper parts of the stems dry off completely and the landscape becomes brown or straw-colour according to the kinds of grasses present. Life remains in the heart of the grass tufts, however; and not only the grasses but many other associated plants with underground resting organs remain dormant until soaking rains and higher soil temperatures stimulate them into renewed growth.

No. 71
SEBAEA EXACOIDES.

In typical grassveld the whole vegetation is herbaceous: but a curious feature is that woody plants (shrubs and small trees) may occur on rocky koppies and randjies in grassland areas, where perhaps they might hardly be expected.

The most abundant of the numerous grass species composing highveld is the Red Grass or Rooigras (*Themeda triandra*), which dominates thousands of square miles of country, and forms valuable pasture for cattle. If over-grazed, however, and especially if subjected to repeated veld fires, the Red Grass may deteriorate and be replaced by other less valuable species. Another frequent effect of veld-burning is to reduce the total amount of protective covering on the soil and so to bring about erosion. In the plains this takes the form of wind-erosion and sheet-erosion, and on steep slopes dongas may form during heavy rains and in a few years may ruin large tracts of valuable ground.

Grassveld varies a good deal in composition in different places according to the amount of rainfall and the depth and physical qualities of the soil. At

tot die plantegroei gereken word wat op hoogliggende terrein, op die deinende heuwels en vlaktes van die sentrale plateau, 4,000 voet bokant die seespieël aangetref word. Om hierdie rede word dit dikwels hoëveld genoem. Hierdie gebied kry feitlik al sy reën in die vorm van swaar stortreëns gedurende die somermaande en in sulke omstandighede groei die meerjarige grassoorte vinnig, en so ver as wat die oog kan sien is die veld groen, behalwe waar dit onderbreek word deur die rooi of bruin grond tussen die graspolle. In die winter is reën egter skaars en hierdie dorheid, gepaard met die feitlik alnagtelike ryp, verhinder die groei van die grassoorte. Die blare en die boonste dele van die stamme verdroog geheel-en-al en die landskap word bruin of strooikleurig, volgens die grassoorte aanwesig. Daar is egter lewe in die hart van die graspolle ; en nie alleen grassoorte nie, maar baie ander verwante plante met ondergrondse rusorgane bly rustend totdat deurdringende reëns en hoër grondtemperature hulle tot vernude groeikrag aanspoor.

Die hele plantegroei van tipiese grasveld is kruidagtig : dog 'n eienaardige kenmerk is dat houterige plantegroei (struikgewasse en klein boompies) op rotsagtige koppies en rantjies in grasstreekgebiede aanwesig kan wees, waar hulle miskien nouliks sou verwag word.

No. 72
STROPHANTHUS SPECIOSUS.

Die oorvloedigste van die talryke grassoorte wat op die hoëveld aangetref word, is die Rooigras (Themeda triandra) wat duisende vierkante myl beslaan en waardevolle weiding vir beeste lewer. As dit egter oorbewei word, en veral as dit aan herhaalde veldbrand blootgestel word, kan die Rooigras verswak en deur ander minder waardevolle soorte vervang word. 'n Verdere dikwels voorkomende uitwerking van veldbrand is om die totale hoeveelheid beskermende bedekking op die grond te verminder en aldus grondverspoeling in die hand te werk. Op die vlaktes kom dit voor in die vorm van wind-erosie en „blad"-erosie en op steil hellings kan donga's gedurende swaar reëns gevorm word en kan groot stukke waardevolle grond binne 'n paar jaar waardeloos gemaak word.

No. 73
CEROPEGIA AMPLIATA.

its margins it gradually shades off into other types of vegetation. In some areas thorn-trees and others appear, thus leading on to savannah: and in other parts a transition to Karoo is produced by the appearance of small shrubs such as the Bitterbos (Chrysocoma) and the Karoobos (Pentzia).

The grassland areas are the most important part of the Union from the agricultural point of view. Cattle-raising is widespread, the natural veld being used for pasture: it is rarely made into hay, but special crops are grown to some extent for hay-making and ensilage. In districts with a good rainfall large quantities of mealies are produced. In the Natal mist-belt plantations of wattles (*Acacia mollissima*) are an important source of tanning materials. Eucalypts are planted for shelter and poles in highveld localities where indigenous trees are entirely absent. Some deciduous frost-resistant fruits are grown. Sheep are also grazed in districts of short grass, e.g. in the upland grass areas of the Eastern Cape.

The attractiveness for pastoral purposes of the seemingly endless rolling grassveld was one of the principal factors which led to the early colonisation of the Free State, Transvaal and the Natal highlands through the Great Trek and subsequent migrations from the Cape Colony.

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Grasveld wissel baie af in samestelling op verskillende plekke volgens die reënval en die diepte en fisiese eienskappe van die grond. By sy grense slaan dit geleidelik oor na ander soorte plantegroei. In sommige streke maak doring- en ander soorte bome hul verskyning, wat die voorposte is van savanna: en in ander streke word 'n oorgang na die Karoo-landskap deur die aanwesigheid van klein struike soos die Bitterbos (Chrysocoma) en die Karoobos (Pentzia) gekenmerk.

Uit die landboukundige oogpunt beskou, is die grasveldgebiede die belangrikste deel van die Unie. Beesboerdery word op groot skaal beoefen, aangesien die natuurlike veld vir weiding dien: die grassoorte word selde vir hooi gebruik, maar spesiale oeste word tot 'n sekere mate gekweek vir die maak van hooi en vir kuilvoer. In distrikte met 'n goeie reënval word groot hoeveelhede mielies geproduseer. Die plantasies wattelbome (Acacia mollissima) in die Natalse mistige streek vorm 'n belangrike bron van looibas. Bloekombome word in hoëveldstreke vir skuiling sowel as vir pale aangeplant, aangesien inheemse bome heeltemal afwesig is. Sommige somervrugte wat bestand is teen ryp word ook gekweek. Skaapboerdery word ook in distrikte met kort gras beoefen, b.v. in die hoogliggende grasstreke van Oos-Kaapland.

Die aanloklikheid van die skynbaar eindelose deinende grasveld as 'n weiveld, was een van die vernaamste faktore wat tot die vroeë kolonisasie van die Vrystaat, Transvaal en die Natalse hoogland met die Groot Trek en daaropvolgende uittogte uit die Kaapkolonie gelei het.

No. 74
AASBLOM.
CARRION FLOWER.
STAPELIA SCHINZII.

Savannah and Bushveld: the Parklike Wilderness

THESE types of vegetation may be regarded as being essentially grassveld with a more or less copious sprinkling of trees. They occur in summer rainfall districts, usually at a lower altitude than pure grassveld, and consequently with less frost in winter. The number of trees present in any area depends largely on the amount of rainfall, and the actual kinds of trees are very often determined by the type of soil, this in its turn being a product (under the influence of climate) of the underlying rock and the degree of slope.

The simplest type of savannah is a grass-covered plain with widely separated woody plants, very frequently species of Acacia and other related genera. These may be mere bushes a few feet high, often with formidable thorns, or they may be small single-stemmed trees up to 30 feet in height, often with flat crowns. The shade cast by these trees is very small and produces practically no effect on the ground vegetation.

As climatic conditions improve the trees may be closer and taller, but they still do not form true forest and the grass vegetation spreads uniformly beneath them

No. 75
CAPE FORGET-ME-NOT.
YSTERGRAS.
ANCHUSA RIPARIA.

Savanna en Bosveld: Die Parkagtige Wildernis

HIERDIE soort plantegroei kan as veral grasveld beskou word, met bome in 'n meerdere of mindere mate aanwesig. Hulle word in somerreënval-distrikte, veral op 'n laer vlak as suiwer grasveld aangetref en gevolglik is daar minder ryp in die winter. Die aantal bome in enige gebied aanwesig, hang hoofsaaklik van die reënval af en die werklike soorte bome word dikwels deur die soort grond bepaal, wat op sy beurt 'n produk (onder die invloed van klimaat) van die onderliggende rots en die steilte van die helling is.

No. 76
WILDE DAGGA.
MINARET FLOWER.
LEONOTIS LEONURUS.

Die eenvoudigste soort savanna is 'n met grasbedekte vlakte met wydverspreide houterige plante wat dikwels uit soorte Acacia en ander verwante geslagte bestaan. Hulle kan bloot bossies wees van 'n paar voet hoog, en dikwels met gedugte dorings, of hulle kan klein, enkelstammige bome, tot 30 voet hoog en dikwels met plat krone, wees. Die skaduwee wat deur hierdie bome gegooi word, is baie klein en het feitlik geen uitwerking op die grond-plantegroei nie.

Namate die klimaatsomstandighede verbeter, kan die bome nader aan mekaar en hoër wees, maar hulle maak nog nie

in what is almost full sunlight. Well developed savannah of this kind produces what is often described as a park-like landscape.

No. 77
PLECTRANTHUS SACCATUS.

In the Northern Transvaal we find large areas of what is known as bushveld, a term which covers a number of different types of vegetation. In one frequent type the trees are fairly closely placed and comparatively few of them are of the Acacia type, the majority having broader leaves: nevertheless grasses are abundant between and below these trees, and the vegetation cannot be called true forest. Rather it can be compared in general appearance with an unpruned, grass-grown orchard. In some districts where different types of soil occur, as for instance north of the Magaliesberg, we may find Acacia savannah on the grey "turf" plains and orchard-like bushveld on the brown soils derived from the igneous rocks. Many characteristic trees grow in this bushveld society, including the well-known Kiepersol (Cussonia), the Dombeyas with their beautiful white or pink flowers, the Kafir Orange (Strychnos) and many Combretums with their four-winged fruits. Many handsome Aloes, Euphorbias and other succulents are associated with it, and the rocky outcrops have their own special flora of drought-resistant and "resurrection" plants.

In the low-veld of the Eastern Transvaal we have a jungle type of country familiar to visitors to the Kruger National Park, in which there is an indiscriminate tangle of trees of various kinds (Acacias, Combretums, etc.), with irregular woody undergrowth, but casting little shade, so that below the tree and shrub layers the ground is occupied by abundant grasses.

Many other types of savannah and bushveld may be recognised. One of the most distinct is the Mopani country in the Northern Transvaal, in which we have a monotonous landscape dominated by one species of tree, the ungraceful Mopani (*Copaifera mopane*) with its curious bilobed butterfly-like leaves. A welcome relief in this and other types of bushveld is the gigantic

SOUR FIGS VYGIES

MESEMBRYANTHEMUM SPP.

There are many hundreds of different kinds of Vygies in the Union, and the majority of them have flowers of brilliant colouring, often accentuated by the shining surface of the petals. They are all more or less succulent and some of them are of very compact form and are drought-resisting in a high degree. A few occur on our mountains, but most of them are plants of the sandveld, Karoo and semi-desert.

Daar bestaan baie honderde verskillende soorte vygies in die Unie en die meerderheid van hulle besit blomme met pragtige kleure, wat dikwels beklemtoon word deur die blinkende oppervlakte van die blomblaartjies. Hulle is almal min of meer vetplantagtig en sommige van hulle besit 'n baie beknopte vorm en is uiters gehard teen droogte. 'n Paar soorte word op ons berge aangetref, maar die meeste van hulle is plante van die sandveld, Karoo en half-woestyn.

ware boswêreld uit nie en die gras tier onder wat feitlik volle sonlig is. Hierdie soort savanna wat goed ontwikkel is, verteenwoordig wat dikwels beskryf word as 'n parkagtige landskap.

In Noord-Transvaal vind ons groot streke wat bekendstaan as bosveld, 'n benaming wat 'n aantal verskillende soorte plantegroei dek. In een soort wat dikwels voorkom, is die bome taamlik na aan mekaar en betreklik weinig van hulle behoort tot die Acacia-tipe maar die meerderheid van hulle besit breër blare : nogtans word gras in oorvloed tussen en onder hierdie bome aangetref en die plantegroei kan nie as ware boswêreld beskou word nie. In algemene voorkoms kan dit liewer vergelyk word met 'n ongesnoeide, met grasbedekte boord. In sommige distrikte waar verskillende soorte grond aanwesig is, soos b.v. noord van Magaliesberg, sal ons Acacia-savanna op die grys „turf"-vlaktes, en boordagtige bosveld op die bruin grond wat van stolrots afkomstig is, aantref. Talryke kenmerkende bome groei in hierdie bosveldgemeenskap, insluitende die bekende Kiepersol (Cussonia) die Dombeyas met hul pragtige wit of ligroos blomme, die Kafferlemoen (Strychnos) en baie soorte Combretums met hul viervlerkige vrugte. Talryke soorte opvallende Alwyn, Euphorbias en ander vetplante word ook daar aangetref en die rotsagtige streke besit hul eie spesiale plantegroei wat bestaan uit droogte-weerstaande en herlewende plante.

No. 78
DIASCIA CAPSULARIS.

In die laeveld van Oos-Transvaal tref ons 'n ruier landskap aan, bekend aan besoekers van die Kruger-wildtuin, waarin daar deurmekaar digte klompe bome is (Acacias, Combretums, ens.) met onreëlmatige houterige kreupelhout, maar wat min skaduwee gooi, sodat onderkant die boom- en struikgewaslae die grond deur weelderige grassoorte in beslag geneem word.

Baie ander soorte savanna- en bosveldwêreld sal herken word. Een van die bekendste is die Mopani-streek in die Noordelike Transvaal, waar ons 'n eentonige landskap aantref, begroei deur een soort boom, die onsierlike Mopani (*Copaifera mopane*) met sy eienaardige, tweelobbige, vlinderagtige blare. 'n

No. 79
HARVEYA BOLUSII.

and grotesque Baobab (Adansonia) with its massive limbs, handsome flowers and large oval fruits. Other distinctive trees are found along spruits, for instance the Fever Tree (*Acacia xanthophloea*) with its greenish-yellow bark, and the magnificent *Kigelia pinnata* with its singular hanging sausage-like fruits and large dusky flowers.

The savannah and bushveld of the Union must be regarded as southward extensions of Central African vegetation, where these types are developed over enormous tracts of country.

The savannah and bushveld types of country were formerly the principal home of the South African big game animals, now reduced to relatively small numbers (except in special reserves) by unrestricted hunting for skins, biltong and "sport." To-day they are chiefly used for cattle-ranching, and some fruit (especially citrus), tobacco, mealies and cotton are also grown.

What may perhaps be considered as a special type of bushveld is the river-bed vegetation which occurs as a narrow strip or fringe along the temporary water-courses in grassveld, karoo and desert. These river-beds, on account of the trees they contain, often form striking features in otherwise monotonous landscapes. Characteristic trees of such situations (though not confined to them) are the Mimosa (*Acacia Karoo*), the Kareeboom (*Rhus lancea*), and several others, together with shrubby and herbaceous vegetation, often of a "brak" nature, grasses and sedges.

Welkome afwisseling hiervan en van ander soorte bosveld, is die reusagtige en groteske Baobab (Adansonia) met sy massiewe takke, pragtige blomme en groot ovaal vrugte. Ander opvallende bome word langs die spruite aangetref, b.v. die Koorsboom (*Acacia xanthophloea*) met sy groengeel bas, en die voortreflike *Kigelia pinnata* met sy eienaardige, hangende worsagtige vrugte en groot donker blomme.

Die savanna-streek en bosveld van die Unie moet as die suidwaartse uitbreidings van die Sentraal-Afrikaanse plantegroei beskou word, waar hierdie soort plantlewe reuse-streke in beslag neem.

Die savanna-streek en bosveldgebied was voorheen die vernaamste tuiste van die Suid-Afrikaanse grootwild, wat nou tot betreklik klein getalle verminder is (behalwe in spesiale reservate) weens die onbeperkte jag terwille van velle, biltong en vir „sportdoeleindes". Vandag word hulle hoofsaaklik gebruik vir weiding vir beeste, terwyl vrugte (veral sitrus), tabak, mielies en katoen ook daar gekweek word.

Wat miskien beskou kan word as 'n spesiale soort bosveld, is die rivierbedding-plantegroei wat voorkom as 'n smal strook of rand langs die tydelike waterlope in die grasveld, Karoo en woestyn. Hierdie rivierbeddings vorm dikwels 'n treffende kenmerk van 'n anders eentonige landstreek, weens die bome in hulle aanwesig. Kenmerkende bome van sulke streke (alhoewel dit nie tot hulle beperk is nie) is die Mimosa (*Acacia Karoo*), die Kareeboom (*Rhus lancea*), en verskeie ander, tesame met struik- en kruidagtige plantegroei, dikwels van 'n brak geaardheid, gras en rietgras.

No. 80
LEEUBEKKIES.
NEMESIA.
NEMESIA STRUMOSA.

Other Types of Vegetation

THE main broad types of vegetation have now been described, but it may be remarked that they only represent a rough sorting-out into separate sections of a vegetation which is really a continuous whole, with all its different parts grading into one another. Always remembering this, it is possible to distinguish several other minor types, occurring in special habitats, and some of these may now be briefly mentioned.

No. 81
SUTERA GRANDIFLORA.

COASTAL VEGETATION.

Many different plant societies may be grouped here. Below high-tide-mark on rocky coasts there is a very rich seaweed "flora" varying chiefly according to the temperature of the water. In the warmer waters of the Natal coast there may be true flowering plants, the so-called Sea Grasses, living in the sand between tide-marks. Where the shore is muddy and the water warm enough the remarkable Mangrove trees may form a fringe along the water's edge, their breathing-roots submerged by the sea at high tide. In cooler waters saline mud-flats are often

Ander Tipes van Plantegroei

Die vernaamste groot soorte plantegroei is nou beskryf, maar daar kan aangestip word dat hulle slegs 'n algemene rangskikking in afsonderlike afdelings van 'n plantegroei verteenwoordig, wat in werklikheid 'n ononderbroke geheel vorm, die verskillende samestellings waarvan met mekaar ineensmelt. As dit altyd voor oë gehou word, is dit moontlik om verskeie ander minder belangrike tipes wat in besondere omgewings voorkom, te onderskei, en sommige daarvan kan nou kortliks bespreek word.

No. 82
PORT ST. JOHNS-KLIMOP.
PORT ST. JOHNS CREEPER.
PODRANEA RICASOLIANA.

KUSPLANTEGROEI.

Talryke verskillende plantegenootskappe kan hier saamgevat word. Onderkant die hoogwatermerk op rotsagtige kuste bestaan daar 'n baie ryk seewier-„plantegroei", wat hoofsaaklik afwissel volgens die temperatuur van die water. In die warmer waters van die Natalse kus kan daar die ware blomplante, die sogenaamde Seegrasse, aanwesig wees, wat in die sand tussen die hoog- en laagwatermerk groei. Waar die kus modderig en die water warm genoeg is, kan die merkwaardige Manglietbome 'n strook langs die kant van die water vorm, met hul

covered by the succulent-stemmed See-kraal (Salicornia). Above high-tide-mark the wind-blown sea-sand becomes fixed in place as the result of a series of processes of colonisation by plants. This sand fixation is often begun by grasses, e.g. the pijpgrass, the fine quick, Sporobolus, etc.—(the introduced marram grass is often planted for this purpose)—and by vigorous trailing plants such as Arctotheca and the goats-foot Ipomoea. After the first fixation other plants can find a foothold, and the well-known berry-wax plant and several other shrubs and herbaceous plants further restrict sand-drift. Finally we get a continuous vegetation and thus new land is reclaimed from the sea. The destruction of this protective vegetation by human agency is often followed by the formation of shifting sand-dunes which may be a serious menace.

No. 83
WILD POMEGRANATE.
DRIEDORING.
RHIGOZUM OBOVATUM.

On rocky slopes near the sea a special type of dwarf forest or scrub may be developed, the trees taking on compact or distorted forms through the action of the salt- and sand-laden sea-breezes.

VLEIS.

The word vlei is used in many different senses, and each of the different types has its own special plants. Even two adjacent vleis may have quite different floras on account of differences in salinity or acidity. Many vleis are only temporary, having a rich flora in the wet season which dies off and only survives in the form of seeds or underground resting-organs (bulbs, tubers, etc.), when the water disappears. Such plants as the Water Uintj'e (Aponogeton), the Water Oxalis, the Water Crassula, the Water Crinum, etc., belong to such temporary vleis. Where the water persists throughout the year we may find other floating plants, for instance, the Water Lily (Nymphaea) and the yellow-flowered Limnanthemum with similar floating leaves. These vleis, both

asemhaalwortels gedurende hoogwater deur die see bedek. In koeler waters word brak moddervlaktes dikwels deur die vetplantstammige Seekraal (Salicornia) bedek. Bokant hoogwatermerk word die deur die wind aangewaaide seesand op sy plek vasgehou as gevolg van 'n reeks kolonisasieprosesse deur plante. Hierdie vasbinding van die sand word dikwels deur grasse begin, soos b.v. die pypgras, die fyn, vinnige Sporobolus, ens.—(die ingevoerde marramgras word dikwels vir hierdie doel geplant)—en deur lewenskragtige rankplante soos Arctotheca en die bokpootvormige Ipomoea. Nadat die fondament eers gelê is, kan ander plante 'n vat kry en die bekende bessiewasplant en verskeie ander soorte struike en bossies verhinder verder die wegdryf van die sand. Eindelik kry ons 'n onafgebroke strook plantegroei, en op hierdie manier word nuwe land uit die see herwin. Die vernietiging van hierdie beskermende plantegroei deur menslike toedoen word dikwels deur die vorming van bewegende sandduine gevolg, wat 'n ernstige bedreiging kan word.

Op rotsagtige hange naby die see kan 'n spesiale soort dwergbos of struikgewas ontwikkel, en die bome het 'n ineengedrukte of verwronge vorm as gevolg van die uitwerking van seewinde wat met sout of sand belaai is.

No. 84
KAFFER-KAMPERFOELIE.
KAFIR HONEYSUCKLE.
TECOMARIA CAPENSIS.

VLEIE.

Die woord vlei word in verskeie sinne gebruik, en elkeen van die soorte het sy eie besondere plantegroei. Daar mag selfs heeltemal verskillende soorte plantegroei in twee aaneengrensende vleie aanwesig wees, weens die verskil in brakkerigheid of suurheid. Baie vleie is slegs van tydelike duur, sodat daar gedurende die reënseisoen 'n weelderige plantegroei aangetref word wat doodgaan en slegs voortbestaan in die vorm van sade of ondergrondse rusorgane (bolle, knolle, ens.) wanneer die water verdwyn. Sulke plante soos die Wateruintjie (Aponogeton), die Water-Oxalis, die Waterklipblom, die Water Crinum, ens., is almal eie aan sulke tydelike vleie. In gevalle waar die water

No. 85
SESAME.
SESAM.
SESAMUM CAPENSE.

permanent and temporary, have also a very rich "flora" of algae and other lowly plants which provide an enthralling study for the microscopist.

There are swampy areas, known also as vleis, in the plains and mountains, and these have typically a vegetation of tall grasses, reeds and sedges, with which may be associated a large variety of other plants (e.g. species of Erica, Chironia, Kniphofia, Wachendorffia, etc.)

On the whole, however, South Africa is poor in aquatic flowering plants as compared with wetter countries, but the ones that do exist here are of exceptional interest. Some are shared with far-distant countries, e.g. the reed-mace (Typha) and the water-plantain (Alisma): others are aquatic members of large South African genera, most species of which inhabit dry land, e.g. Oxalis, Crassula, Crinum, Hypoxis.

RIVERSIDE VEGETATION.

In the case of rivers which run all the year round, (as distinct from dry stream-beds), we find several special trees and shrubs occupying the banks and islands: many of these have narrow, elongated leaves. The various kinds of Willows (Salix) are typical of such situations, where we also find the interesting Metrosideros (with Australasian affinities), the curious tree-Composite Brachylaena, Freylinia, etc. In addition there are several grasses, reeds and rushes amongst the trees, and a very characteristic plant of clear rivers is the Palmiet (Prionium) which may grow so thickly as almost to choke the stream.

MOUNTAIN VEGETATION.

Under this heading we can include, not a definite plant society, but the large number of plants which are at home in the crevices and ledges of

dwarsdeur die jaar standhoudend is, kan ons ander drywende plante aantref, soos by voorbeeld die Waterlelie (Nymphaea) en die geelblommige Limnanthemum met soortgelyke drywende blare. Hierdie vleie, sowel dié wat permanent as dié wat tydelik is, besit ook 'n uitgebreide „flora" soos wier en ander primitiewe plante wat 'n boeiende studie vir die mikroskopis vorm.

Daar is moerasagtige streke, ook bekend as vleie, op die vlaktes en berge en hul plantegroei bestaan tipies uit hoë gras, riet en rietgras, waarby ook 'n groot verskeidenheid ander plantesoorte gereken kan word (b.v. soorte Erica, Chironia, Kniphofia, Wachendorffia, ens.).

In die algemeen is Suid-Afrika egter arm aan hoër waterplante, in vergelyking met vogtiger landstreke; maar dié wat hier aanwesig is, is buitengewoon interessant. Sommige word ook gevind in verafgeleë lande, b.v. die rietfoelie (Typha) en die waterweeblaar (Alisma): ander soorte is waterlede van groot Suid-Afrikaanse families, die meeste vertakkings waarvan op droë grond groei, b.v. Oxalis, Crassula, Crinum, Hypoxis.

RIVIERWALPLANTEGROEI.

In die geval van riviere wat dwarsdeur die jaar loop (in teenstelling met droë spruite) vind ons dat verskeie spesiale bome en struike die oewers en eilande daarvan begroei: baie van hierdie plante het smal, lang blare. Die verskillende soorte Wilgeboom (Salix) is tipies van hierdie streke, waar ons ook die interessante Metrosideros (met Australiese verwante), die eienaardige boom-komposiet, Brachylaena, Freylinia, ens., aantref. Boonop is daar verskeie grassoorte, riet en biesies tussen die bome, en 'n uiters kenmerkende plant van helder riviere is die Palmiet (Prionium) wat so dik kan groei dat dit byna die loop van die water opdam.

No. 86
STREPTOCARPUS MULTIFLORUS.

BERGPLANTEGROEI.

Onder hierdie hoof kan ons insluit nie 'n bepaalde

mountain rocks, especially at higher altitudes where moisture can be obtained to some extent throughout the year from rain and mountain mists. The flora of the upper levels in the Cape coastal ranges is very rich and noteworthy, largely owing to the effect of the south-easterly clouds. Here we find a considerable number of dwarf species of Erica.

On the highest summits in the Cape mountains, where snow lies during much of the winter, peculiar mat-like plants (species of Aspalathus, Helichrysum, Roella, etc.), with dense small leaves and stalkless flowers lie closely pressed to the ground: these are the nearest approach to "alpines" that we have in South Africa.

No. 87
MACKAYA.
MACKAYA BELLA.

Rocks with a south aspect and a constantly moist surface are the homes of the beautiful Red Disa (*D. uniflora*) and Drip Disa (*D. longicornu*), and other Orchids occupy similar situations. Some plants are strictly confined to rock crevices, even on relatively arid mountains, for instance, the Kliprhenoster (*Helichrysum ericoides*), *Teedia lucida* and *Erica Maximiliani* on the inhospitable rocks of the Witteberg and Swartberg.

WEEDS OF CULTIVATION.

The disturbance of the soil by plough or spade creates a special habitat for plants, and some species (which may be infrequent in the wild state) find it to their liking and grow in vast numbers as "weeds of cultivation." These plants go through their whole life-history between one ploughing and the next. Many of them are annuals, often with very conspicuous flowers: the brilliant floral display in a good season in Namaqualand is largely due to such annual weeds of abandoned wheat-fields. Others are small shrubs, flowering in the first or second year and specially adapted to the fallow, such as the rhenoster bush (Elytropappus) and the Klaas Louw bush, familiar in the Cape. In addition a large number of alien plants are only found as weeds of cultivation.

plantegenootskap nie, maar die groot aantal plante wat groei in die splete en op lyste van bergkranse, veral hoog bokant die seevlak, waar vogtigheid tot 'n sekere mate dwarsdeur die jaar in die vorm van reën en bergnewels verkry word. Die plantegroei van die boonste dele van die Kaapse kusberge is baie weelderig en opvallend, hoofsaaklik weens die uitwerking van die suid-oostelike wolke. Hier tref ons 'n aansienlike reeks dwerg-Erica's aan.

Op die hoogste toppe van die Kaapse berge waar sneeu gedurende 'n groot deel van die winter aanwesig is, word eienaardige matagtige plante (soorte Aspalathus, Helichrysum, Roella, ens.) met digte klein blaartjies en stamlose blommetjies wat dig teen die grond aan gedruk is, aangetref: laasgenoemde is die naaste aan Alpe-plantegroei wat ons in Suid-Afrika vind.

Rotse met 'n suidelike aspek en 'n gedurig vogtige oppervlakte is die tuiste van die pragtige Rooi Disa (*D. uniflora*) en Drupdisa (*D. longicornu*) en ander Orgideë word in dergelike omgewings aangetref. Sommige plantesoorte is streng tot rotssplete beperk, selfs op betreklik droë berge, b.v. die Kliprenoster (*Helichrysum ericoides*), *Teedia lucida* en *Erica Maximiliani* op die troostelose rotse van die Witteberg en die Swartberg.

ONKRUID.

No. 88
ALBERTA MAGNA.

Die opbreek van die aardlaag deur 'n ploeg of 'n graaf skep 'n spesiale tuiste vir plante, en sommige soorte (wat skaars is in die veld) verkies hierdie soort grond met die gevolg dat „onkruid" in menigte daar posvat. Baie daarvan is jaarplante, dikwels met baie opvallende blomme: die kleurryke blommeversameling in 'n goeie seisoen in Namakwaland, is hoofsaaklik aan sulke jaar-onkruid van verlate graanlande te danke. Ander is klein struikgewasse, wat in die eerste of tweede jaar blom en wat hulle spesiaal by brak grond kan aanpas, soos die renosterbos (Elytropappus) en die Klaas Louwbos, wat so bekend is in Kaapland. Boonop word 'n groot aantal uitheemse plante slegs in die vorm van onkruid aangetref.

How Some of our Plants Live

In order to live, grow and reproduce themselves plants must have food. Most plants obtain part of their food from the air and part from the soil: they take in simple chemical substances by their leaves and roots, and inside their living tissues reactions take place by which more living substance and organic food materials are produced. The plant is in fact a most elaborate chemical laboratory or factory, the activities of which are of marvellous complexity and co-ordination.

No. 89
WILD POMEGRANATE.
BUFFELSHORING.
BURCHELLIA CAPENSIS.

Life is always a struggle for the wild plant: it has to compete with its fellows for what is usually a very scanty food supply, as well as for space in which to develop and light to provide the energy to run its living machinery. It is not surprising that some plants have adopted unorthodox methods for obtaining some or all of their necessary food.

PARASITES.

Some plants, known as parasites, obtain part or the whole of their food by attaching themselves to other plants,

Hoe Sommige van ons Plante-soorte Leef

Om te kan lewe, te kan groei en hulself te kan voortplant, moet plante voedsel hê. Die meeste plante verkry 'n deel van hul voedsel uit die lug en 'n deel daarvan uit die grond: hulle absorbeer eenvoudige chemiese bestanddele deur hul blare en wortels en binne in hul lewende weefsels vind reaksies plaas waarvolgens meer lewende stof en organiese voedselmateriaal voortgebring word. Die plant is trouens 'n mees ingewikkelde chemiese laboratorium of fabriek, die bedrywighede waarvan verbasend omvangryk en samehangend is.

Die lewe is altyd 'n stryd vir die veldgewas: hy moet meeding met sy makkers om wat gewoonlik 'n uiters karige voedselvoorraad is, sowel as om ruimte waarin hy kan ontwikkel en om lig om die energie te verskaf om sy lewende masjinerie aan te dryf. Dit is nie verbasend nie dat sommige plante onortodokse metodes aanvaar het, waarvolgens hulle 'n gedeelte of al hul noodsaaklike voedsel verkry.

No. 90
KATJIEPIERING.
GARDENIA.
GARDENIA THUNBERGII.

PARASIETE.

Sommige plante, as parasiete bekend, verkry 'n deel of

No. 91
SCABIOUS.
SCABIOSA COLUMBARIA.

called their "hosts." The most familiar examples in South Africa are the mistletoes, Viscum and Loranthus, most of which grow as bushy masses on the stems of other shrubs or trees. Instead of roots these plants insert special suckers into the tissues of their hosts and rob them of portion of their food: they are, however, able to obtain the remainder of their requirements from the air by virtue of the green pigment, chlorophyll, which they possess in their leaves or stems. They are therefore only "partial parasites." The seeds of these mistletoes are deposited on the branches of the host by birds, whence the name "voëlent."

There are many other partial parasites which attach themselves to the roots of their hosts: careful digging is necessary to reveal the connections. (E.g. species of Thesium, Melasma, etc.)

Total parasitism is displayed by several indigenous plants which derive the whole of their food in organic form from their hosts. The baviaanskost, Hydnora, is parasitic on Euphorbias, and its strange solid brown and pink flower was once mistaken for a fungus. The bright red inflorescences of Hyobanche are well known, pushing out of the bare soil. Both of these are attached to their hosts underground. The dodder (Cuscuta) and the nooishaar (Cassytha) twine round the stems and leaves of their hosts into which they insert their suckers. The witchweed (Striga) is a serious pest in mealie lands. A feature of all these total parasites is the absence or scantiness of green chlorophyll and the fact that they are leafless or merely bear scales in place of leaves.

CARNIVOROUS PLANTS.

Another unusual method of obtaining food is that of the carnivorous (or insectivorous) plants, of which our flora contains several. The sundews (Drosera) have special glistening and sticky tentacles on their leaves: these attract small insects which are firmly caught. The tentacles then excrete a digestive

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SCABIOSA COLUMBARIA.

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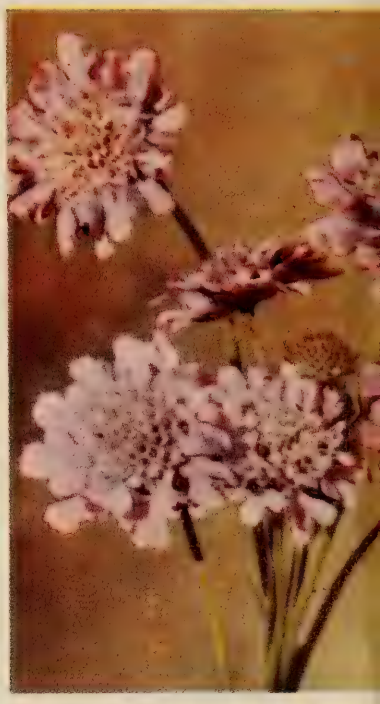

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BRUNIA STOKOEI

Brunia Stokoei is a recent discovery in the Hottentots Holland Mountains. It is a handsome shrub of six to eight feet in height, and its crimson flower-heads are striking and unusual in this family in which white flowers predominate. Flowers in February and March. Grown at Kirstenbosch.

Brunia Stokoei is 'n onlangse ontdekking in die Hottentotshollandberge. Dit is 'n pragtige struikgewas, ses tot agt voet hoog en die bloedrooi blomhofies daarvan is pragtig en buitengewoon in hierdie familie, waarin wit blomme die botoon voer. Blom in Februarie en Maart. Op Kirstenbosch gekweek.

al hul voedsel deur hulself aan ander plante bekend as hul „gashere" te bevestig. Die bekendste voorbeelde in Suid-Afrika is die voëlent, Viscum en Loranthus, die meeste waarvan in 'n digte bos op die stamme van ander struikgewasse of bome aanwesig is. I.p.v. wortels, plaas hierdie plante spesiale suiers in die weefsels van hul gashere en beroof hulle van 'n deel van hul voedsel: hulle is egter daartoe in staat om die res van hul benodigdhede uit die lug te verkry, danksy hul groen kleurstof, klorofiel, wat in hul blare of stamme aanwesig is. Hulle is derhalwe slegs „gedeeltelik parasities". Die saad van hierdie plante word deur voëls op die takke van hul gasheer agtergelaat, van daar die naam „voëlent".

Daar is talryke ander gedeeltelike parasiete wat hulself aan die wortels van hul gashere bevestig: sorgvuldige opgrawing is nodig om die verbindings te kan bespeur (b.v. soorte Thesium, Melasma, ens.).

Totale parasitisme word geopenbaar deur verskeie inheemse plante wat hul hele voedselvoorraad in organiese vorm van hul gashere verkry. Die bobbejaanskos, Hydnora, is parasities op Euphorbias en die vreemde soliede bruin en ligroos bloeisel is vroeër foutief as 'n swam bestempel. Die helder rooi bloeisels van Hyobanche, wat uit die kaal grond opstoot, is goed bekend. Albei hiervan is onder die grond aan hul gashere gevestig. Die dodder (Cuscuta) en die nooienshaar (Cassytha) draai hulle om die stamme en blare van hul gashere waarin hul hul suiers laat deurdring. Die rooiblom (Striga) is 'n ernstige pes in mielielande. 'n Kenmerk van al hierdie totale parasiete is die afwesigheid van of skaarste aan groen klorofiel en die feit dat hulle blaarloos is of bloot skale i.p.v. blare, dra.

No. 92
BLOU LOBELIA.
BLUE LOBELIA.
LOBELIA PINIFOLIA.

VLEESETENDE PLANTE.

Nog 'n buitengewone metode van voedsel te verkry, word geopenbaar deur die vleesetende (of insekte-etende) plante, waarvan daar verskeie voorbeelde onder ons plantegroei bestaan. Die „sundews" (Drosera) besit spesiale, glinsterende en klewerige voelhaartjies op hul blare: hulle lok klein insektetjies aan wat styf vasgehou

liquid which dissolves the soft tissues of the insect, the products being absorbed into the plant through the leaf surface. In this way the sundews obtain nitrogenous food. (It may be remarked that there are many other plants which catch insects by means of sticky excretions, but make no use of them as food and are therefore not to be called carnivorous.)

In the Utricularias, which live in water or in saturated soil, the plant bears small bladder-like traps of remarkable construction. The trap has a water-tight door in front, and when "set" its sides are flattened. If an inquisitive small water animal touches the door it springs open and the elastic sides of the trap expand, so that there is a rush of water into the trap which carries the animal inside. Once caught the animal finds escape impossible, dies and is digested by the plant.

No. 93
ROELLA CILIATA.

SUCCULENCE.

The life of a plant not only involves a struggle for food, but also for water. In such a country as this where rainfall over great areas is either scanty or erratic or both, and where prolonged dry periods or drought seasons are frequent, any plant must solve the water problem efficiently or perish. The device known as succulence is one of the many ways in which plants cope with water scarcity, and South Africa is outstanding, along with the dry regions of America, for the wealth of succulents in its flora. And whereas in America very few families (Cactaceae, Crassulaceae) contain succulents, in South Africa they occur in a large number of families and in an amazing variety of forms. (See p. 65.)

Succulence may be exhibited by stems or leaves. Examples of stem-succulents are the Euphorbias and the various genera belonging to the Stapelia family: in these plants the leaves are mere vestiges and all the vegetative functions as well as water storage are carried out by the swollen stems. The

word. Die voelhaartjies skei dan 'n absorberende vloeistof af wat die sagte weefsels van die insek oplos, en die oplossing word dan in die plant in deur die oppervlakte van die blaar geabsorbeer. Op hierdie manier verkry die plant stikstofbevattende voedsel. (Daar kan aangestip word dat daar verskeie ander soorte plante bestaan, wat insekte deur middel van klewerige afskeidings vang, maar hulle teer nie op die insekte nie, en dus kan hulle nie as vleesetend bestempel word nie.)

In die Utricularias, wat in water of deurweekte grond aangetref word, besit die plant klein blaasagtige valletjies wat merkwaardig saamgestel is. Die valletjie besit 'n waterdigte deur voor en wanneer hy „gestel" is, is die kante plat. As 'n nuuskierige klein waterdiertjie die deur aanraak, vlieg hy oop, en die rekbare kante van die valletjie sit uit, sodat daar 'n hoeveelheid water die valletjie binnevloei en die diertjie op hierdie manier binne-in laat beland. Wanneer die diertjie eers binnekant is, is dit vir hom onmoontlik om te ontvlug, gevolglik sterf hy en word hy deur die plant geabsorbeer.

SAPPIGHEID.

No. 94
GOUSBLOM.
MARIGOLD.
ARCTOTIS SPP.

Die lewe van 'n plant gaan nie alleen gepaard met 'n stryd om voedsel nie, maar ook om water. In 'n land soos ons s'n waar die reënval oor uitgestrekte gebiede óf karig óf onreëlmatig óf albei is, en waar aanhoudende droogtes dikwels ondervind word, is enige plant daartoe genoodsaak om sy watervraagstuk doeltreffend op te los of om te vergaan. Wat ons ken as sappigheid, is een van die baie maniere waarop plante 'n skaarste aan water die hoof bied, en Suid-Afrika en die droë streke van Amerika is beroemd weens hul talryke sukkulente of vetplante. En waar in Amerika baie min families (Cactaceae, Crassulaceae) sukkulente bevat, kom hulle in Suid-Afrika in 'n groot aantal families en in 'n verbasende verskeidenheid van vorms voor. (Sien bl. 66.)

Sappigheid kan deur die stamme of

No. 95
WILD ASTER.
WILDE ASTER
ASTER FRUTICULOSUS.

vast group of the Mesembryanthemums are nearly all leaf-succulents: some have elongated slender stems with pairs of fleshy leaves at intervals; these are the shrubby and trailing types. Others, the so-called stemless types, have short stems and very few—often only two—much enlarged leaves at a time; and in the most highly specialised types the fleshy leaves and stems are fused into one mass which sometimes approaches a spherical shape, this being the form which exposes the least surface relatively to bulk. The large genus Crassula shows a smaller range of similar forms.

Some plants have both stems and leaves succulent, for instance the botterboom of the Karoo (a Cotyledon) and the botterboom of South-West Africa (a Cissus), both of which have the additional peculiarity that they are deciduous, the former losing its leaves in the summer, the latter in the winter. Other plants, which may also be regarded as succulents, store water in underground tubers, roots or bulbs.

The function of succulence is of course to conserve water and so enable the plant to survive during long dry periods. The majority of succulents have roots very near the surface of the soil, so that they are able to take up moisture from quite small showers or even from a heavy dew such as is deposited on the cold ground before sunrise. Once inside the plant this moisture is held with great tenacity. The temperature inside a Euphorbia stem may be as much as 125 degrees during a hot day; and succulents in full sunshine may become too hot to touch comfortably, like the soil around them: yet they remain plump and full of their precious water. They are able to do this because of their very impervious outer skin or cuticle and also because they contain mucilaginous substances which retain water strongly.

Some succulents are called mimicry plants because they so closely resemble in form and colour the stones among which they grow as to be almost invisible to any but a trained and watchful eye. The various species of Lithops and

blare getoon word. Voorbeelde van stam-sukkulente is die Euphorbias en die verskillende geslagte wat onder die Stapelia-familie ressorteer: in hierdie plante is die blare bloot 'n oorblyfsel, en al die plantaardige funksies sowel as die waterbewaring word deur die opgeswelde stamme waargeneem. Die reuse-groep Mesembryanthemums is byna almal blaar-sukkulente: sommige besit langwerpige slank stammetjies met af en toe pare vleesagtige blaartjies; hulle is die struik- en ranksoorte. Ander, die sogenaamde stamlose soorte, besit kort stammetjies en baie min—dikwels slegs twee—baie vergrote blaartjies op 'n slag; en in die geval van die hoogs gespesialiseerde tipes is die vleesagtige blare en stamme in een massa saamgesmelt, wat somtyds naasteby die fatsoen van 'n sfeer besit, aangesien dit 'n vorm is wat die kleinste oppervlakte in verhouding tot die grootte blootstel. Die groot geslag Crassula toon ons 'n kleiner reeks dergelike fatsoene.

Sommige plante het sappige stamme sowel as blare, b.v. die botterboom van die Karoo ('n Cotyledon) en die botterboom van Suidwes-Afrika ('n Cissus), albei waarvan 'n bykomende eienaardigheid besit, naamlik dat hulle bladwisselend is—die eersgenoemde verloor sy blare in die somer en laasgenoemde in die winter. Ander plante, wat ook as sukkulente beskou kan word, vergader water in ondergrondse knolle, wortels of bolle.

Die doel van sappigheid is natuurlik om water te bewaar en om die plant op hierdie manier in staat te stel om gedurende lang droë tydperke te kan voortbestaan. Die meerderheid van sukkulente besit wortels baie naby die oppervlakte van die grond, sodat hulle in staat is om vogtigheid van 'n ligte reën of selfs van 'n swaar douneerslag wat voor sonop op die koue grond gelaat word, te absorbeer. Wanneer hierdie vogtigheid eenmaal binne in die plant is, word dit daar hardnekkig bewaar. Die temperatuur binne 'n Euphorbia-stam kan soveel as 125 grade gedurende 'n warm dag beloop; en sukkulente wat aan die volle gloed van die son blootgestel is, kan te warm word om met gemak aangeraak te word, net soos die grond rondom hulle; tog bly hulle dik en vol kosbare vog.

No. 96
BLOU MADELIEFIE.
BLUE DAISY.
CHARIEIS HETEROPHYLLA.

Pleiospilos known as stone plants are celebrated for their mimicry. Many people think this must be a means of defence against grazing animals: but this is to underrate the sharpness of sight and smell of a hungry animal: moreover these plants are often very conspicuous when they flower. The reason why animals do not destroy them is probably not because they are inconspicuous but because they are unpalatable.

No. 97
KLAAS LOUWBOS.
ATHANASIA TRIFURCATA.

REPRODUCTION.

From the plant's point of view the flower is a means towards the production of seed for the propagation of the species. In order to produce seed pollen has to be placed on the stigma of the flower, and in most flowers this can only take place if it is somehow carried there. Moreover, in many cases a plant's own pollen cannot effect fertilisation, so that pollen has to be brought from another plant.

Some flowers are wind-pollinated: these are usually small, inconspicuous, without scent and nectar, have long feathery stigmas and produce large quantities of dry, dusty pollen. The grasses are examples of this, and the pollination of such a grass as the mealie is familiar to everyone.

Other flowers have conspicuous colours, perfumes and nectar, relatively smaller stigmas, and sticky pollen in smaller quantity. These are pollinated by insects—bees, flies, moths, beetles, etc.—which visit one flower after another and so transfer the pollen: and in South Africa we also have many flowers regularly visited by the long-beaked sugar-birds—the Proteas and some long-tubed heaths, for instance. This subject of insect- and bird-pollination is a most attractive study for the nature-lover and has been very little explored in the Union.

Seed having been produced, it must be dispersed, and here again similar agencies come into play. The wind carries the very small seeds and also those with membranous wings or feathery parachutes. Birds eat sweet, fleshy coloured fruits and excrete the undigested seeds. Animals pick up burs and sticky

Hulle is hiertoe in staat weens hul uiters ondeurdringbare vel of opperhuid en ook omdat hulle slymerige samestellings bevat wat water uitstekend bewaar.

Sommige sukkulente word mimiekplante genoem, omdat hulle in vorm en kleur so verbasend op die klippe waartussen hulle groei, gelyk dat hulle feitlik onsigbaar is vir alle oë behalwe dié wat daartoe opgelei of oplettend is. Die verskillende soorte Lithops en Pleiospilos, bekend as klipplante, is bekend weens hul nabootsing. Baie mense meen dat dit 'n verdedigingsmaatreël teen weidende diere is : maar dit sou 'n onderskatting van die oë en ruik van 'n honger dier wees : wat meer is, hierdie plante is dikwels baie opvallend wanneer hulle blom. Die rede waarom diere hulle nie vernietig nie, is waarskynlik nie omdat hulle onopvallend is nie, maar omdat hulle onsmaaklik is.

VOORTPLANTING.

Uit die oogpunt van die plant beskou, is die bloeisel 'n middel vir die vorming van saad om die geslag mee voort te plant. Om saad te kan vorm, moet stuifmeel op die stempel van die blom geplaas word, en in die geval van die meeste soorte blomme kan dit slegs geskied as dit op een of ander manier daarheen gevoer word.

No. 98
BARBERTON DAISY.
GERBERA JAMESONII.

Voorts, in baie gevalle kan die plant se eie stuifmeel nie bevrugting teweegbring nie, en derhalwe moet stuifmeel van 'n ander plant gebring word.

Sommige soorte blomme word deur die wind bestuif : hulle is gewoonlik klein, onopvallend, sonder geur en heuning, besit lang veeragtige stempels en bring groot hoeveelhede droë, poeieragtige stuifmeel voort. Die grassoorte is 'n voorbeeld hiervan en die bestuiwing van so 'n grassoort soos die mielie is bekend aan elkeen.

Ander soorte blomme besit opvallende kleure, geure en heuning, betreklik kleiner stempels en 'n kleiner hoeveelheid klewerige stuifmeel. Hulle word bestuif deur insekte—bye, vlieë, motte, kewers, ens.—wat een blom na die ander besoek en op hierdie manier die stuifmeel oordra : en

seeds. Some plants have elastic mechanisms which shoot the ripe seeds to a distance. Others produce seeds which can float uninjured for thousands of miles in ocean currents.

The life of plants is a struggle for water, food, light and air : their reproduction involves, as it were, the most ingenious use of wind, water and the impulses and habits of insects, birds and animals. In South Africa we live in the midst of these marvels, for all who have eyes to see.

No. 99.
EVERLASTING.
SEWEJAARTJIE.
PHOENOCOMA PROLIFERA

in Suid-Afrika besit ons ook talryke soorte blomme wat gereeld deur die langbekkige suikervoëltjies besoek word—b.v. die Proteas en 'n paar heidesoorte met lang kelkies. Hierdie onderwerp van bestuiwing deur insekte en voëls is 'n uiters boeiende studie vir die natuurliefhebber en baie min aandag is nog daaraan bestee in die Unie.

Wanneer saad gevorm is, moet dit versprei word, en hier weer kom dergelike middels in aanmerking. Die wind dra die klein saadjies en ook dié met vliesagtige vlerkies of veeragtige valskermpies. Voëls eet soet, vleserige vrugte en werp die onverteerde saad uit. Diere tel klitse en klewerige sade op. Sommige plante besit 'n veerkragtige meganisme wat die ryp saad 'n ent wegskiet. Ander bring saad voort wat duisende myle in seestrome kan dryf.

Die lewe van plante is 'n stryd om water, voedsel, lig en lug: hul voortplanting is as 't ware afhanklik van die vernuftigste gebruik van wind, water en die gewoontes van insekte, voëls en diere. In Suid-Afrika leef ons te midde van al hierdie wonders, as ons net ons oë wil gebruik.

No. 100
URSINIA ANETHOIDES.

Prim little scholars are the flowers of her garden,

Trained to stand in rows, and asking if they please.

I might love them well but for loving more the wild ones :

O my wild ones ! they tell me more than these.

(*Meredith: Love in the Valley*).

Nette klein leerlinge is die blomme van haar tuin,

Geoefen in rye te staan en te vra asseblief.

Ek mag hulle bemin maar die wilde blommetjies het ek meer lief:

O, my wilde blommetjies! hulle vertel my meer dan hierdie.

(*Meredith: Love in the Valley*).

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